

INTEGRATED  
Environmental Services, Inc.

September 22, 1997

Rodney Nelson  
Program Manager

James E. Ross  
Unit Chief, Site Cleanup Unit

California Regional Water Quality Control Board  
Los Angeles Region  
101 Center Plaza Drive  
Monterey Park, CA 91754-2156

**Subject: Application for Facility Permit/Waste Discharge  
Boeing Realty Corporation C-6 Facility**

Dear Gentlemen:

On behalf of the Boeing Realty Corporation, Integrated Environmental Services, Inc. is pleased to submit the attached Facility Permit/Waste Discharge application package for your review and approval. The package includes a fully executed Form 200 application sheet, permit fee of \$400.00, and supporting documentation to allow the Bradley Landfill in Sun Valley, California, to use the C-6 facility's excavated soils for daily cover.

I visited the Bradley Landfill on September 18, two days after our meeting at your office. The attached health-based allowable soil concentrations (Attachment 1 of the Supplemental Documentation) were developed based on conservative construction-worker exposures at the Bradley Landfill. As shown in the waste profile sheets (Attachment 2), and the calculated allowable soil concentrations, the C-6 excavated soils can be used as daily cover and would not pose any adverse impact to the workers.

If you have any questions, or need more information, please contact me directly. Your expedited approval is appreciated.

Sincerely,



Michael Y. Young, Ph.D.  
President

Enclosures: 3

CC: Karen Baker (DTSC-LB)  
Dr. Debra Odiz (DTSC-Sac)  
S. Mario Stavale (Boeing)



*Cal/EPA*

**Los Angeles  
Regional Water  
Quality Control  
Board**

101 Centre Plaza Drive  
Monterey Park, CA  
91754-2156  
(213) 266-7500  
FAX (213) 266-7600

September 24, 1997

Pete Wilson  
Governor



Mr. Michael Y. Young, Ph.D.  
President  
Integrated Environmental Services, Inc.  
3990 westerly Place, Suite 210  
Newport Beach, CA 92660

**WASTE DISCHARGE REQUIREMENTS FOR DISCHARGE OF HYDROCARBON  
CONTAMINATED SOIL - BOEING REALTY CORPORATION C-6 FACILITY -  
(File No. 88-57-086(97))**

On September 23, 1997, you filed with this Board a report of waste discharge to discharge up to 5,000 cubic yards of hydrocarbon contaminated soil in a Class III Landfill in this Region. This material could be used as daily cover at Bradley Landfill. Approval of soil used for daily cover is contingent upon concurrence by the Integrated Waste Management Board and any Local Enforcement Agency.

We have reviewed the information provided and have determined that the proposed discharge of this material meets the conditions specified in Order No. 91-93, "General Waste Discharge Requirements for Discharge of Non-Hazardous Contaminated Soils and Other Wastes in Los Angeles River and Santa Clara River Basins", adopted by this Board on July 22, 1991.

Enclosed are Waste Discharge Requirements, comprising:

1. General Waste Discharge Requirements
2. Monitoring and Reporting Program

Please note that the Monitoring and Reporting Program requires that a report be submitted to this Board within 10 days of the completion of disposal operations, ATTN: Data and Information Management Unit. The report shall reference the above file number.

If you have any questions, please contact Don Peterson at (213) 266-7578.

*Dennis A. Dickerson*  
*for*  
**DENNIS A. DICKERSON**  
Executive Officer

Enclosures  
cc: CIWMB  
Los Angeles City Department of Environmental Affairs



*Our mission is to preserve and enhance the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations.*

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD  
LOS ANGELES REGION

MONITORING AND REPORTING PROGRAM  
for  
DISCHARGE OF NON-HAZARDOUS CONTAMINATED SOILS  
AND OTHER WASTE

BOEING REALTY CORPORATION C-6 FACILITY

File No. 88-57-086(97)

I. Reporting

- A. The discharger shall implement this monitoring and reporting program on the date of issuance of the Waste Discharge Requirements.
- B. The monitoring report shall be submitted within ten (10) days following the completion of disposal operations at the final point of disposal.
- C. All analytical samples obtained for this program shall be grab samples.
- D. In the event that hazardous or other unacceptable wastes are detected during disposal, the type, source, and final disposition of these wastes shall be reported.

II. Waste Disposal Reporting

- A. A report containing the following information shall be filed with this Regional Board after completion of all waste disposal:
  - 1. A tabular list of the estimated average quantities (in cubic yards) and types of materials deposited.
  - 2. Where the material was deposited (landfill name).
  - 3. A certification that all wastes deposited were in compliance with the Regional Board's requirements and that no wastes have been deposited outside of the boundaries of the site as specified in the Regional Board's requirements.
  - 4. In those cases where approval is given for the partial disposal of contaminated soils or other wastes, the ultimate disposal point of the remaining contaminated soils or other wastes must be reported, including the quantity of material disposed of at the different location.

General Waste Discharge Requirements  
Discharge of Non-Hazardous Contaminated Soils

File No. 88-57

B. Monitoring reports shall be signed by:

1. In case of corporation, by a principal executive officer at least of the level of vice-president or his duly authorized representative, if such representative is responsible for the overall operation of discharge;
2. In the case of a partnership, by a general partner;
3. In case of a sole proprietorship, by the proprietor;
4. In the case of a municipal, state or other public facility, by either a principal executive officer, ranking elected official, or other duly authorized employee.

C. The report shall contain the following completed declaration:

"I declare under penalty of perjury that the foregoing is true and correct.

Executed on the \_\_\_\_\_ day of \_\_\_\_\_ at \_\_\_\_\_  

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(Signature)  

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(Title)"  

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D. The discharger shall mail a copy of the monitoring report to the following:

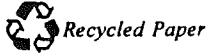
California Regional Water Quality Control Board  
Los Angeles Region  
101 Centre Plaza Drive  
Monterey Park, CA 91754-2156  
Attn: Data and Information Management Unit

Ordered by:

  
DENNIS A. DICKERSON  
Executive Officer

  
Date: September 24, 1997

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*Our mission is to preserve and enhance the quality of California's water resources, and ensure their proper allocation and efficient use for the benefit of present and future generations.*

State of California  
CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD, LOS ANGELES REGION

ORDER NO. 91-93

GENERAL WASTE DISCHARGE REQUIREMENTS

FOR

DISCHARGE OF NON-HAZARDOUS CONTAMINATED SOILS AND OTHER WASTES  
IN LOS ANGELES RIVER AND SANTA CLARA RIVER BASINS  
(File No. 88-57)

The California Regional Water Quality Control Board, Los Angeles Region finds:

1. The California Water Code requires that any person discharging wastes or proposing to discharge waste which could affect the quality of the waters of the state shall file a Report of Waste Discharge with the Regional Board. The Regional Board then shall prescribe requirements as to the nature of the proposed or existing discharge.
2. Soils contaminated with moderate concentrations of petroleum hydrocarbons, heavy metals and other special wastes are considered to be wastes whose discharge could affect the quality of the waters of the State.
3. Land disposal of these wastes to properly engineered and managed Class III Waste Management Units (Landfills) is proving to be an efficient and economical means of mitigating the effects of such contaminated waste. The threat to waters of the State is thereby eliminated or reduced to non-significant levels.
4. Each month this Board receives a large number of requests for the disposal of soils contaminated with hydrocarbons and other waste. For each such request, staff has to determine the concentration of the significant contaminants/pollutants in the waste, the regulatory limits, if any, for the contaminants/pollutants, and the potential impact on the waters of the State from the disposal of the waste. Such requests are anticipated to continue and far exceed the capacity of staff to review and bring to the Board for consideration of individual waste discharge requirements in a timely manner. These circumstances create the need for an expedited system for processing the numerous requests for disposal of these moderately contaminated wastes.

June 12, 1991

General Waste Discharge Requirements  
Discharge of Non-Hazardous Contaminated Soils

File No. 88-57

5. The adoption of general waste discharge requirements for the disposal of these non-hazardous contaminated soils and other similar wastes would: a) simplify the application process for dischargers, b) allow more efficient use of Regional Board staff time; and c) reduce Regional Board time by enabling the Executive Officer to notify the discharger of the applicability of the General Waste Discharge Requirements.
6. These general waste discharge requirements for the disposal of non-hazardous contaminated soils and other similar waste up to 100,000 cubic yards for durations not to exceed 90 days under direction of the Executive Officer would benefit the public, staff, and the Board by accelerating the review process without loss of regulatory jurisdiction and oversight.
7. The Board adopted revised Water Quality Control Plans for the Santa Clara River and Los Angeles River Basins on October 22, 1990 and June 3, 1991, respectively. These Water Quality Control Plans contain water quality objectives for ground water for all Hydrologic Subareas within the Region. The requirements contained in this Order, as they are met, will be in conformance with the goals of the Water Quality Control Plans.
8. Beneficial uses of ground water in the Los Angeles Region include municipal and domestic supply, agricultural supply, industrial process supply, and ground water recharge. Beneficial uses for individual Hydrologic Subareas are specified in the Water Quality Control Plans.
9. The Class III Landfill disposal is a one time, short term disposal, and is not anticipated to require in excess of 90 days to complete at which time these requirements will expire.
10. The issuance of Waste Discharge Requirements for the discharges subject to these general requirements is exempt from the provisions of Chapter 3, (commencing with Section 21100) of Division 13, of the Public Resources Code pursuant to one or more of the following provisions:

General Waste Discharge Requirements  
Discharge of Non-Hazardous Contaminated Soils

File No. 88-57

- (a) The lead agency has prepared an Environmental Impact Report or a negative declaration based on findings pursuant to California Code of Regulations, Title 14, Chapter 3, Section 15070 which show that there will be no significant impact on water quality; or
- (b) The project would affect a minor alteration to the condition of land, and is exempt in accordance with Title 14, Chapter 3, Section 15304, California Code of Regulations.
11. These general waste discharge requirements are not intended to alter or supersede any existing restrictions or working arrangements relating to cleanup cases with local governmental agencies.

The Board has notified interested agencies and persons of its intent to adopt general waste discharge requirements for disposal of hydrocarbon contaminated soils and other similar wastes and has provides them with an opportunity to submit their written views and recommendations.

The Board in a public meeting heard and considered all comments pertaining to the tentative requirements.

IT IS HEREBY ORDERED THAT:

A. APPLICABILITY

1. This Order shall serve as General Waste Discharge Requirements for the discharge of non-hazardous contaminated soil and other similar wastes to properly engineered and managed Waste Management Units.
2. Upon receipt of a Report Waste Discharge describing such discharge, the Executive Officer shall determine if such discharge, a) involves 100,000 cubic yards or less of hydrocarbon contaminated soil and/or other similar waste, b) involves contaminated soils and/or other similar wastes at acceptable levels as determined by the Executive Officer, but total petroleum hydrocarbons (TPH) shall not exceed an average concentration of 1,000 mg/kg, c) will be completed within 90 days, and d) is covered by adequate soil characterization of the nature and extent of the soil contamination, and e) the threat to ground water from such soil and/or other waste discharge is reduced to non-significant levels.

In the event the Executive Officer so finds, he shall notify the applicant (hereinafter called the Discharger) in writing that the proposed discharge is subject to this Order.

3. Notwithstanding the above provisions, individual cases may be brought to the Board for adoption of waste discharge requirements when deemed appropriate by the Executive Officer..

**B. WASTE DISCHARGE REQUIREMENTS**

1. No condition of pollution or nuisance shall be caused by the handling of the wastes or from any excavation operation conducted in association with this waste disposal operation.
2. Odors from the handling of these wastes shall not be perceivable beyond the limits of the property owned or controlled by the discharger.
3. All required state and local permits and/or variances shall be obtained by the discharger prior to commencing the disposal operations.
4. The discharge and disposal of waste shall be in conformance with Title 23, Division 3, Chapter 15, California Code of Regulations "Discharge of Waste to Land".
5. Wastes discharged shall be limited to material obtained from one site only; no other wastes shall be imported and/or commingled with those wastes.
6. Wastes may be discharged at a classified Waste Management Unit in the Los Angeles Region, provided the analyses are representative of the entire volume of material and with the concurrence of the site operator.
7. Waste discharged or reclaimed for reuse as soil backfill shall not contain any substance in concentrations toxic to human, animal, plant, or aquatic life.

General Waste Discharge Requirements  
Discharge of Non-Hazardous Contaminated Soils

File No. 88-57

8. The discharge of wastes shall be to a legal point of disposal or to a site approved by the Executive Officer and in accordance with the provisions of Division 7.5 of the Water Code. For the purposes of these requirements, a legal disposal site is one for which requirements have been established by a California Regional Water Quality Control Board and which is in compliance therewith.

C. PROVISIONS

1. A copy of these requirements shall be maintained by the discharger at the proposed site and be available at all times to operating personnel.
2. In the event the discharger is unable to comply with any of the conditions of this Order due to:
  - (a) Breakdown of waste disposal equipment,
  - (b) Accidents caused by human error or negligence,
  - (c) Other causes such as acts of nature,
  - (d) Facility operations

The discharger must notify this Board by telephone within 24 hours of the incident and confirm it in writing within one week of the telephone notification.

3. In accordance with Section 13260 of the California Water Code, the discharger shall file a report of material change with this Regional Board of any material change in the character, location or volume of the discharge.
4. The Discharger shall allow the Regional Board or an authorized representative upon the presentation of credentials and other documents as may be required by law, to:
  - (a) Enter upon premises where a regulated facility or activity is located or conducted, or where records are kept under the conditions of this Order;

General Waste Discharge Requirements  
Discharge of Non-Hazardous Contaminated Soils

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- (b) Have access to, and copy at reasonable times, any records that are kept under the conditions of this Order;
  - (c) Inspect, at reasonable times, any facility, equipment (including monitoring and control equipment), practices, or operations regulated or required under this Order; and
  - (d) To photograph, sample, or monitor, at reasonable times, for the purpose of assuring compliance with this Order, or as otherwise authorized by the California Water Code.
5. In accordance with Section 13263 of the Water Code, these waste discharge requirements are subject to periodic review and revision by this Regional Board.
  6. These requirements do not exempt the discharger from compliance with any other laws, regulations, or ordinances which may be applicable, they do not legalize this soil disposal or similar waste and they leave unaffected any further restraints on those facilities which may be contained in other status or contained by other regulatory agencies.

D. EXPIRATION

These Waste Discharge Requirements regulating a specific short term soil or similar waste discharge expire 90 days after the Executive Officer has determined this Order is applicable to the specific project.

I, Robert P. Ghirelli, Executive Officer, do hereby certify that the foregoing is a full, true and correct copy of an Order adopted by the California Regional Water Quality Control Board, Los Angeles Region on July 22, 1991.

Robert P. Ghirelli  
ROBERT P. GHIRELLI, D.Env.  
Executive Officer

STATE OF CALIFORNIA

REGIONAL WATER QUALITY CONTROL BOARD  
 DEPARTMENT OF HEALTH SERVICES  
 SOLID WASTE MANAGEMENT BOARD  
 DEPARTMENT OF FORESTRY



## APPLICATION FOR FACILITY PERMIT/WASTE DISCHARGE

This form is to be used for filing a/an: (check all appropriate)

- REPORT OF WASTE DISCHARGE**  
(pursuant to Division 7 of the State Water Code)
- APPLICATION FOR A HAZARDOUS WASTE FACILITY PERMIT**  
(pursuant to Health and Safety Code Section 25200)
- APPLICATION FOR A SOLID WASTE FACILITIES PERMIT**  
(pursuant to Government Code Section 86796.30)
- APPLICATION FOR A RUBBISH DUMP PERMIT**  
(pursuant to Public Resources Code Sections 4371-4375 and 4438)

<b>FOR OFFICE USE ONLY</b>	
Form 200 Rec'd _____	
Fee (RWQCB) _____ (SWMB) _____	
Letter to Discharger _____	
Report Rec'd _____	
Effective Date _____	
CDF Notified _____	
DOHS No. _____	
SWMB No. _____	

### I. FACILITY

A. NAME OF FACILITY <b>Boeing Realty Corporation C-6 Facility</b>	TELEPHONE # _____
--	-------------------

ADDRESS <b>19503 S. Normandie Ave., Los Angeles, California 90502</b>	ZIP CODE _____
--	----------------

B. NAME OF LEGAL OWNER OF FACILITY <b>Boeing Realty Corporation</b>	TELEPHONE # _____
--	-------------------

ADDRESS <b>4060 Lakewood Blvd., 6th Floor, Long Beach, California 90808</b>	ZIP CODE _____
--	----------------

C. NAME OF BUSINESS OPERATING FACILITY <b>Same as above</b>	TELEPHONE # _____
--	-------------------

ADDRESS _____	ZIP CODE _____
---------------	----------------

D. TYPE OF BUSINESS OPERATING FACILITY			
<input type="checkbox"/> Sole Proprietorship	<input type="checkbox"/> Partnership	<input checked="" type="checkbox"/> Corporation	<input type="checkbox"/> Government Agency

E. NAME OF OWNER(S) OF BUSINESS OPERATING FACILITY			
<b>Boeing Realty Corporation</b>			

ADDRESS WHERE LEGAL NOTICE MAY BE SERVED			
<b>4060 Lakewood Blvd., 6th Floor, Long Beach, California 90808</b>			

### II. REASON FOR FILING

CHECK ALL APPROPRIATE:

- A.  New discharge or facility
- B.  Existing discharge or facility
- C.  Increase in quantity of discharge

- D.  Change in character of discharge
- E.  Change in place or method of disposal
- F.  Change in design or operation

- G.  Change in business operating facility
- H.  Enlargement of existing facility
- I.  Other (explain below)

### III. TYPE OF OPERATION

CHECK ALL APPROPRIATE:

- A.  Transfer station
- B.  Solid waste disposal site
- C.  Hazardous waste disposal site

- D.  Sewage treatment
- E.  Industry (on-site disposal facility)
- F.  Industry (discharge to sewer)

- G.  Woodwaste site
- H.  Other (explain below)

### IV. TYPE OF WASTE

CHECK ALL APPROPRIATE:

- A.  Sewage, sewage sludge, and/or septic tank pumpings
- B.  Industrial wastes
- C.  Municipal solid wastes
- D.  Hazardous wastes

- E.  Agricultural wastes
- F.  Animal wastes
- G.  Forest product wastes
- H.  Construction/demolition wastes

- I.  Inert materials
- J.  Dead animals
- K.  Tires
- L.  Other (explain below)

### V. SITE DESIGN CAPACITY

A. PRESENT POPULATION OR CAPACITY	B. DESIGN POPULATION OR ULTIMATE CAPACITY	C. LIFE EXPECTANCY (YEARS)
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## VI. QUANTITY OF WASTES

A. PRESENT OR PROPOSED DAILY FLOW (IN MGD):	MAXIMUM	AVERAGE	B. DESIGN FLOW (IN MGD)
C. SOLID WASTE DISPOSAL SITE (IN TONS OR CUBIC YARDS):	DAILY QUANTITY	TOTAL IN PLACE QUANTITY	D. AREA IN WHICH SOIL WILL BE DISTURBED (IN ACRES)
		5,000 cu yds	TOTAL SITE AREA

## VII. LOCATION OF POINT OF DISPOSAL OR OPERATION

(DESIGN AND ATTACH MAP, SKETCH, OR LOCATION ON U.S.G.S. QUADRANGLE MAP, 7.5 OR 15 MINUTE SERIES.)

LIST DISTANCES OR BEARING AND DISTANCE FROM SECTION CORNER OR QUARTER CORNER, SECTION, TOWNSHIP, RANGE, BASE AND MERIDIAN:

Permit to use 5,000 cu yds of excavated soil as daily cover at Bradley Landfill,  
Sun Valley, California.

Soil to be transported by truck to Bradley Landfill.

## VIII. SOURCE OF WATER SUPPLY (CHECK ALL APPROPRIATE)

A. <input type="checkbox"/> MUNICIPAL OR UTILITY SERVICE:  NAME OF WATER PURVEYOR	B. <input type="checkbox"/> INDIVIDUAL (Wells)  C. <input type="checkbox"/> SURFACE SUPPLY:  NAME OF STREAM, LAKE, SPRING, ETC. (IF NAMED)	
ADDRESS OF PURVEYOR	TYPE OF WATER RIGHTS <input type="checkbox"/> Riparian <input type="checkbox"/> Appropriation	WATER RIGHTS PERMIT OR LICENSE #

## IX. ENVIRONMENTAL IMPACT REPORT (EIR)

Has an EIR been prepared for this project?  Yes     No

If "Yes", please enclose a copy.

If "No", will an EIR be prepared?  Yes     No

Will a negative declaration be prepared?

If "Yes", please answer the following:

WHO WILL PREPARE THE NEGATIVE DECLARATION?

APPROX. DATE OF COMPLETION

## CERTIFICATION

I hereby certify under penalty of perjury that the information provided in this application and in any attachments is true and accurate to the best of my knowledge.

SIGNATURE OR OWNER OF FACILITY 	SIGNATURE OF OPERATOR OF FACILITY 
PRINTED OR TYPED NAME S. Mario Stavale	PRINTED OR TYPED NAME S. Mario Stavale
TITLE Project Manager	TITLE Project Manager

LIST TITLES OF ANY ATTACHMENTS:

Analytical data summaries for 20 stockpiles (each 250 cu yds) totaling 5,000 cubic yards.

You will be notified of the correctness of filing fee and submittal or any additional information deemed necessary to complete your Report of Waste Discharge pursuant to Division 7, Section 13260 of the State Water Code, or to complete your permit application pursuant to Government Code Section 66796.30 and Health and Safety Code Section 25200.



**GENERATOR'S WASTE PROFILE SHEET**  
PLEASE PRINT IN INK OR TYPE

Service Agreement on File?  YES  NO

Profile Number: WMI

Renewal Date:

507762

/ /

**A. Waste Generator Information**

1. Generator Name: Boeing Realty Corporation
2. SIC Code: \_\_\_\_\_
3. Facility Street Address: 19503 South Normandie Ave.
4. Phone: (562) 627-3014
5. Facility City: Los Angeles
6. State/Province: \_\_\_\_\_
7. Zip/Postal Code: 90502
8. Generator USEPA/Federal ID #: CAD08651000513985
9. County: Los Angeles
10. State/Province ID #: \_\_\_\_\_
11. Customer Name: Boeing Realty Corporation
12. Customer Phone: (562) 627-3014
13. Customer Contact: S. Mario Stavale
14. Customer Fax: 562-627-3109

**B. Waste Stream Information**

1. Name of Waste: Excavated soil
2. State Waste Code: non-hazardous
3. Process Generating Waste: Non-hazardous soil to be used as daily cover at Bradley Landfill at Sun Valley, California.
4. Estimated Annual Volume: 50,000  Tons  Yards  Other (specify) \_\_\_\_\_
5. Personal Protective Equipment Requirements: None
6. Transporter/Transfer Station: \_\_\_\_\_
7. Is this a U.S. Department of Transportation (USDOT) Hazardous Material? (If no, skip 8, 9, & 10).....  YES  NO
8. Reportable Quantity (lbs.; kgs.): None
9. Hazard Class/ID #: None
10. USDOT Shipping Name: \_\_\_\_\_

Check if additional information is attached. Indicate the number of attached pages:

**C. Generator's Certification (Please check appropriate responses, sign, and date below.)**

1. Is the waste represented by this waste profile sheet a "Hazardous Waste," as defined by USEPA, Canadian, Mexican and/or state/province regulation, in the location where generated or ultimately managed?.....  YES  NO
2. Does the waste represented by this waste profile sheet contain regulated radioactive material or regulated concentrations of Polychlorinated Biphenyls (PCBs)?.....  YES  NO
3. Does this waste profile sheet and all attachments contain true and accurate descriptions of the waste material?.....  YES  NO
4. Has all relevant information within the possession of the Generator regarding known or suspected hazards pertaining to the waste been disclosed to the Contractor?.....  YES  NO
5. Is the analytical data attached hereto derived from testing a representative sample in accordance with 40 CFR 261.20 (c) or equivalent rules?.....  NA  YES  NO
6. Will all changes that occur in the character of the waste be identified by the Generator and disclosed to the Contractor prior to providing the waste to the Contractor?.....  YES  NO

Certification Signature: S. Mario Stavale

Title: Project Manager

Name (Type or Print): S. Mario Stavale Company Name: Boeing Realty Corp. Date: 9-22-97

**D. WMI Management's Decision**

FOR WMI USE ONLY

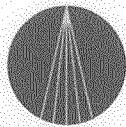
1. Management Method:  Landfill  Solidify  Bioremediation  Other (Specify) \_\_\_\_\_
2. Proposed Ultimate Management Facility: \_\_\_\_\_ 3. Hours of acceptance: \_\_\_\_\_  NA
4. Supplemental Information: \_\_\_\_\_
5. Precautions, Special Handling Procedures, or Limitations on Approval: \_\_\_\_\_

Special Waste Decision.....  Approved  Disapproved

Salesperson's Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Division Approval Signature (Optional): \_\_\_\_\_ Date: \_\_\_\_\_

Special Waste Approvals Person Signature: \_\_\_\_\_ Date: \_\_\_\_\_



**INTEGRATED**  
Environmental Services, Inc.

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# **Application for Facility Permit / Waste Discharge**

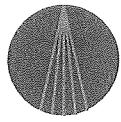
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## **Supplemental Documentation**

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**Boeing Realty Corporation  
C-6 Facility  
Los Angeles, California  
September 1997**





INTEGRATED  
Environmental Services, Inc.

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# Application for **Facility Permit / Waste Discharge**

## **Supplemental Documentation**

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Boeing Realty Corporation  
C-6 Facility

Los Angeles  
California

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September 1997

*Prepared by*  
Integrated Environmental Services, Inc.

*For*  
The Boeing Realty Corporation

Application for  
Facility Permit / Waste Discharge  
**Supplemental Documentation**  
Boeing Realty Corporation  
C-6 Facility

**Attachment 1**

**Health-Based Allowable Soil Concentrations Based on  
Conservative Construction Worker Exposures  
At Bradley Landfill**

**Table 1**  
**Health-Based Soil Concentrations (mg/kg),**  
**Based on Construction Worker Exposures**

Constituent	HBRG HQ=0.2 (mg/kg)	HBRG ILCR=10 <sup>-6</sup> (mg/kg)	Initial HBRG (mg/kg)
1-butanol	4.71E+05	NA	4.71E+05
1,1-dichloroethane	2.20E+05	1.62E+05	1.62E+05
1,1-dichloroethene	1.94E+03	1.46E+03	1.46E+03
1,1,1,2-tetrachloroethane	6.79E+03	3.71E+04	6.79E+03
1,1,2-trichloroethane	9.00E+03	1.33E+04	9.00E+03
1,1,2,2-tetrachloroethane	NA	3.57E+03	3.57E+03
1,2-dibromo-3-chloropropane	2.50E+03	1.38E+02	1.38E+02
1,2-dibromoethane	7.38E+03	2.69E+02	2.69E+02
1,2-dichlorobenzene	NA	NA	NT
1,2-dichloroethane	NA	1.35E+04	1.35E+04
1,2-dichloropropane	3.53E+03	1.24E+04	3.53E+03
1,2-diphenylhydrazine	NA	1.11E+03	1.11E+03
1,2,3-trichloropropane	1.36E+04	1.38E+02	1.38E+02
1,2,4-trichlorobenzene	2.28E+03	NA	2.28E+03
1,3-dichloropropene	6.76E+02	5.36E+03	6.76E+02
1,4-dichlorobenzene	5.71E+07	2.42E+04	2.42E+04
2-butanone	4.52E+05	NA	4.52E+05
2-chlorophenol	1.14E+04	NA	1.14E+04
2-methylphenol	1.14E+05	NA	1.14E+05
2-naphthylamine	NA	5.39E+02	5.39E+02
2,4-dichlorophenol	6.83E+02	NA	6.83E+02
2,4-dimethylphenol	4.55E+04	NA	4.55E+04
2,4-dinitrophenol	4.56E+02	NA	4.56E+02
2,4-dinitrotoluene	4.55E+02	3.13E+03	4.55E+02
2,4,5-trichlorophenol	2.28E+05	NA	2.28E+05
2,4,6-trichlorophenol	NA	1.39E+04	1.39E+04
2,6-dinitrotoluene	2.28E+03	1.43E+03	1.43E+03
3,3-dichlorobenzidine	NA	8.08E+02	8.08E+02
4-chloroaniline	9.10E+02	NA	9.10E+02
4-methyl-2-pentanone	1.79E+05	NA	1.79E+05
4-methylphenol	1.14E+03	NA	1.14E+03

**Table 1 (Cont.)**

Constituent	HBRG HQ=0.2 (mg/kg)	HBRG ILCR=10 <sup>-6</sup> (mg/kg)	Initial HBRG (mg/kg)
4,4-ddd	NA	5.66E+03	5.66E+03
4,4-dde	NA	4.00E+03	4.00E+03
4,4-ddt	1.60E+02	4.00E+03	1.60E+02
acenaphthene	1.06E+05	NA	1.06E+05
acetone	2.24E+05	NA	2.24E+05
acrolein	NA	NA	NT
acrylonitrile	2.25E+03	9.57E+02	9.57E+02
aldrin	9.57E+00	7.99E+01	9.57E+00
alpha-bhc	NA	2.16E+02	2.16E+02
aniline	3.85E+05	1.70E+05	1.70E+05
anthracene	5.31E+04	NA	5.31E+04
antimony	1.18E+02	NA	1.18E+02
aroclor 1016	NA	NA	NT
aroclor 1254	1.14E+01	NA	1.14E+01
arsenic	1.16E+02	1.10E+03	1.16E+02
barium	3.30E+04	NA	3.30E+04
benzene	NA	9.42E+03	9.42E+03
benzidine	6.83E+02	1.94E+00	1.94E+00
benzoic acid	9.11E+05	NA	9.11E+05
benzo(a)anthracene	NA	6.28E+02	6.28E+02
benzo(a)pyrene	NA	6.28E+01	6.28E+01
benzo(b)fluoranthene	NA	6.28E+02	6.28E+02
benzo(k)fluoranthene	NA	6.28E+02	6.28E+02
benzyl alcohol	2.28E+05	NA	2.28E+05
benzyl chloride	NA	5.68E+03	5.68E+03
beryllium	2.04E+02	2.48E+08	2.04E+02
beta-bhc	NA	7.55E+02	7.55E+02
beta-chloronaphthalene	NA	NA	NT
bis(2-chloro-1-methylethyl)ether	NA	1.38E+04	1.38E+04
bis(2-chloroethyl)ether	NA	3.87E+02	3.87E+02
bis(2-ethylhexyl)phthalate	NA	1.15E+05	1.15E+05
bromodichloromethane	4.53E+03	7.42E+03	4.53E+03
bromoform	4.53E+03	1.22E+05	4.53E+03
bromomethane	NA	NA	NT

**Table 1 (Cont.)**

Constituent	HBRG HQ=0.2 (mg/kg)	HBRG ILCR=10 <sup>-6</sup> (mg/kg)	Initial HBRG (mg/kg)
cadmium	2.15E+02	1.39E+08	2.15E+02
carbazole	NA	4.85E+04	4.85E+04
carbon disulfide	2.22E+04	NA	2.22E+04
carbon tetrachloride	NA	6.30E+03	6.30E+03
chlordanne	1.37E+01	8.08E+02	1.37E+01
chlorobenzene	NA	NA	NT
chloroform	2.35E+03	3.26E+04	2.35E+03
chloromethane	NA	6.76E+04	6.76E+04
chromium iii	4.21E+05	NA	4.21E+05
chromium vi	1.06E+04	5.39E+03	5.39E+03
chrysene	NA	6.28E+03	6.28E+03
cis-1,2-dichloroethene	2.20E+04	NA	2.20E+04
copper	1.64E+04	NA	1.64E+04
cumene	8.24E+04	NA	8.24E+04
cyanide	9.14E+03	NA	9.14E+03
dibenzo(a,h)anthracene	NA	1.84E+02	1.84E+02
dibromochloromethane	4.41E+04	1.00E+04	1.00E+04
dichlorodifluoromethane	1.14E+05	NA	1.14E+05
dieldrin	1.60E+01	8.49E+01	1.60E+01
diethyl phthalate	1.82E+06	NA	1.82E+06
di-n-butylphthalate	2.28E+05	NA	2.28E+05
di-n-octylphthalate	4.55E+03	NA	4.55E+03
endosulfan	1.91E+03	NA	1.91E+03
endrin	9.58E+01	NA	9.58E+01
ethyl chloride	1.49E+07	NA	1.49E+07
ethylbenzene	NA	NA	NT
fluoranthene	9.11E+04	NA	9.11E+04
fluorene	9.11E+04	NA	9.11E+04
gamma-bhc	9.90E+02	1.28E+03	9.90E+02
heptachlor	1.06E+02	1.59E+02	1.06E+02
heptachlor epoxide	4.14E+00	1.04E+02	4.14E+00
hexachlorobenzene	NA	5.38E+02	5.38E+02
hexachlorobutadiene	NA	1.24E+04	1.24E+04
hexachlorocyclopentadiene	6.15E+03	NA	6.15E+03

**Table 1 (Cont.)**

Constituent	HBRG HQ=0.2 (mg/kg)	HBRG ILCR=10 <sup>-6</sup> (mg/kg)	Initial HBRG (mg/kg)
hexachloroethane	2.27E+03	2.48E+04	2.27E+03
indeno(1,2,3-cd)pyrene	NA	8.08E+02	8.08E+02
isobutyl alcohol	6.76E+05	NA	6.76E+05
isophorone	4.55E+05	1.02E+06	4.55E+05
mercury	8.86E+01	NA	8.86E+01
methoxychlor	1.14E+03	NA	1.14E+03
methyl methacrylate	1.75E+04	NA	1.75E+04
methylene bromide	2.23E+04	NA	2.23E+04
methylene chloride	1.44E+04	7.24E+04	1.44E+04
methyl-tert-butyl ether	NA	NA	NT
molybdenum	1.62E+04	NA	1.62E+04
n-butylbenzyl phthalate	4.55E+04	NA	4.55E+04
nickel	3.12E+03	2.29E+09	3.12E+03
nitroaniline, o-	8.43E+05	NA	8.43E+05
nitrobenzene	1.14E+03	NA	1.14E+03
nitrosodiphenylamine, p-	NA	4.41E+04	4.41E+04
n-nitrosodimethylamine	NA	4.31E+01	4.31E+01
n-nitroso-di-n-propylamine	NA	1.38E+02	1.38E+02
n-nitrosodiphenylamine	NA	1.08E+05	1.08E+05
o-chlorotoluene	4.49E+04	NA	4.49E+04
p-chloro-m-cresol	4.55E+05	NA	4.55E+05
pentachlorophenol	3.98E+03	3.14E+04	3.98E+03
phenol	1.37E+05	NA	1.37E+05
pyrene	3.07E+04	NA	3.07E+04
selenium	2.37E+03	NA	2.37E+03
silver	1.69E+03	NA	1.69E+03
styrene	3.16E+07	NA	3.16E+07
tetrachloroethene	2.26E+04	1.89E+04	1.89E+04
toluene	4.72E+05	NA	4.72E+05
toxaphene	NA	8.08E+02	8.08E+02
trans-1,2-dichloroethene	4.39E+04	NA	4.39E+04
trichloroethene	NA	6.63E+04	6.63E+04
trichlorofluoromethane	1.56E+05	NA	1.56E+05
vanadium	1.09E+03	NA	1.09E+03

**Table 1 (Cont.)**

Constituent	HBRG HQ=0.2 (mg/kg)	HBRG ILCR= $10^{-6}$ (mg/kg)	Initial HBRG (mg/kg)
vinyl acetate	1.78E+05	NA	1.78E+05
vinyl chloride	NA	1.46E+03	1.46E+03
xylenes	4.52E+05	NA	4.52E+05
zinc	1.14E+05	NA	1.14E+05

Note:

NA - Not Applicable

NT - No Toxicity Data for Compound

**Table A**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Incidental Ingestion of Soils**

$$\text{Intake Equation} = \frac{\text{CS} \times \text{EF} \times \text{ED} \times \text{CF} \times \text{IR}}{\text{BW} \times \text{AT}}$$

IRs	Ingestion rate of soil (RAGS, 1989)	480 mg/day
CF	Conversion factor	1.0E-06 kg/mg
EF	Exposure frequency	20 d/year
EDn	Exposure duration for non-carcinogens	0.082 year
EDc	Exposure duration for carcinogens	0.082 year
BW	Body weight	70 kg
ATc	Average time for carcinogens (lifetime)	25550 day
ATn	Average time for non-carcinogens (EDn x 365)	30 day
CS	Concentration of chemicals in soil	(see table below)

**Chemical Concentrations**

Compound	Concentration	Compound	Concentration
1-butanol	1.0E+00	2-butanone	1.0E+00
1,1-dichloroethane	1.0E+00	2-chlorophenol	1.0E+00
1,1-dichloroethene	1.0E+00	2-methylphenol	1.0E+00
1,1,1,2-tetrachloroethane	1.0E+00	2-naphthylamine	1.0E+00
1,1,2-trichloroethane	1.0E+00	2,4-dichlorophenol	1.0E+00
1,1,2,2-tetrachloroethane	1.0E+00	2,4-dimethylphenol	1.0E+00
1,2-dibromo-3-chloropropane	1.0E+00	2,4-dinitrophenol	1.0E+00
1,2-dibromoethane	1.0E+00	2,4-dinitrotoluene	1.0E+00
1,2-dichlorobenzene	1.0E+00	2,4,5-trichlorophenol	1.0E+00
1,2-dichloroethane	1.0E+00	2,4,6-trichlorophenol	1.0E+00
1,2-dichloropropane	1.0E+00	2,6-dinitrotoluene	1.0E+00
1,2-diphenylhydrazine	1.0E+00	3,3-dichlorobenzidine	1.0E+00
1,2,3-trichloropropene	1.0E+00	4-chloroaniline	1.0E+00
1,2,4-trichlorobenzene	1.0E+00	4-methyl-2-pentanone	1.0E+00
1,3-dichloropropene	1.0E+00		
1,4-dichlorobenzene	1.0E+00		

**Table A (cont.)**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Incidental Ingestion of Soils**

Compound	Non-Carcinogenic Calculation			Carcinogenic Calculation		
	CDI (mg/kg-d)	RfD (mg/kg-d)	UH (unitless)	CDI (mg/kg-d)	CSF (mg/kg-d).i	UR (unitless)
1-butanol	3.75E-07	1.00E+00	3.75E-07	4.40E-10	NA	NA
1,1-dichloroethane	3.75E-07	1.00E+00	3.75E-07	4.40E-10	5.70E-03	2.51E-12
1,1-dichloroethene	3.75E-07	9.00E-03	4.17E-05	4.40E-10	6.00E-01	2.64E-10
1,1,1,2-tetrachloroethane	3.75E-07	3.00E-02	1.25E-05	4.40E-10	2.60E-02	1.14E-11
1,1,2-trichloroethane	3.75E-07	4.00E-02	9.37E-06	4.40E-10	7.20E-02	3.17E-11
1,1,2,2-tetrachloroethane	3.75E-07	NA	NA	4.40E-10	2.70E-01	1.19E-10
1,2-dibromo-3-chloropropane	3.75E-07	NA	NA	4.40E-10	7.00E+00	3.08E-09
1,2-dibromoethane	3.75E-07	NA	NA	4.40E-10	3.60E+00	1.58E-09
1,2-dichlorobenzene	3.75E-07	NA	NA	4.40E-10	NA	NA
1,2-dichloroethane	3.75E-07	NA	NA	4.40E-10	7.00E-02	3.08E-11
1,2-dichloropropane	3.75E-07	NA	NA	4.40E-10	6.30E-02	2.77E-11
1,2-diphenylhydrazine	3.75E-07	NA	NA	4.40E-10	8.70E-01	3.83E-10
1,2,3-trichloropropane	3.75E-07	6.00E-02	6.25E-06	4.40E-10	7.00E+00	3.08E-09
1,2,4-trichlorobenzene	3.75E-07	1.00E-02	3.75E-05	4.40E-10	NA	NA
1,3-dichloropropene	3.75E-07	3.00E-03	1.25E-04	4.40E-10	NA	NA
1,4-dichlorobenzene	3.75E-07	NA	NA	4.40E-10	1.80E-01	7.92E-11
2-butanone	3.75E-07	2.00E+00	1.87E-07	4.40E-10	4.00E-02	1.76E-11
2-chlorophenol	3.75E-07	5.00E-02	7.50E-06	4.40E-10	NA	NA
2-methylphenol	3.75E-07	5.00E-01	7.50E-07	4.40E-10	NA	NA
2-naphthylamine	3.75E-07	NA	NA	4.40E-10	1.80E+00	7.92E-10
2,4-dichlorophenol	3.75E-07	3.00E-03	1.25E-04	4.40E-10	NA	NA
2,4-dimethylphenol	3.75E-07	2.00E-01	1.87E-06	4.40E-10	NA	NA
2,4-dinitrophenol	3.75E-07	2.00E-03	1.87E-04	4.40E-10	NA	NA
2,4-dinitrotoluene	3.75E-07	2.00E-03	1.87E-04	4.40E-10	3.10E-01	1.36E-10
2,4,5-trichlorophenol	3.75E-07	1.00E+00	3.75E-07	4.40E-10	NA	NA
2,4,6-trichlorophenol	3.75E-07	NA	NA	4.40E-10	7.00E-02	3.08E-11
2,6-dinitrotoluene	3.75E-07	1.00E-02	3.75E-05	4.40E-10	6.80E-01	2.99E-10
3,3-dichlorobenzidine	3.75E-07	NA	NA	4.40E-10	1.20E+00	5.28E-10
4-chloroaniline	3.75E-07	4.00E-03	9.37E-05	4.40E-10	NA	NA
4-methyl-2-pentanone	3.75E-07	8.00E-01	4.69E-07	4.40E-10	NA	NA

**Table B**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Dermal Contact with Soils**

**Intake Equation** = CS X CF X EF X ED X AF X ABS X SA  
BW X AT

SA	Surface area of exposed skin (50th percentile, hands only)	5800 cm <sup>2</sup> /day
AF	Adherence Factor	1 mg/cm <sup>2</sup>
ABS	Absorption factor (see table below)	csv
CF	Conversion factor	1.0E-06 kg/mg
EF	Exposure frequency	20 d/year
EDn	Exposure duration for non-carcinogens	0 year
EDc	Exposure duration for carcinogens	0 year
BW	Body weight	70 kg
ATc	Average time for carcinogens (lifetime)	25550 day
ATn	Average time for non-carcinogens (EDn x 365)	30 day
CS	Concentration of chemicals in soil (see table below)	csv

**Chemical Concentrations**

Compound	ABS (unitless)	Concentration (mg/kg)	Compound	ABS (unitless)	Concentration (mg/kg)
1-butanol	NA	1.00E+00	2-butanone	1.00E-01	1.00E+00
1,1-dichloroethane	1.00E-01	1.00E+00	2-chlorophenol	1.00E-01	1.00E+00
1,1-dichloroethene	1.00E-01	1.00E+00	2-methylphenol	1.00E-01	1.00E+00
1,1,1,2-tetrachloroethane	1.00E-01	1.00E+00	2-naphthylamine	1.00E-01	1.00E+00
1,1,2-trichloroethane	1.00E-01	1.00E+00	2,4-dichlorophenol	1.00E-01	1.00E+00
1,1,2,2-tetrachloroethane	1.00E-01	1.00E+00	2,4-dimethylphenol	1.00E-01	1.00E+00
1,2-dibromo-3-chloropropane	1.00E-01	1.00E+00	2,4-dinitrophenol	1.00E-01	1.00E+00
1,2-dibromoethane	1.00E-01	1.00E+00	2,4-dinitrotoluene	1.00E-01	1.00E+00
1,2-dichlorobenzene	1.00E-01	1.00E+00	2,4,5-trichlorophenol	1.00E-01	1.00E+00
1,2-dichloroethane	1.00E-01	1.00E+00	2,4,6-trichlorophenol	1.00E-01	1.00E+00
1,2-dichloropropane	1.00E-01	1.00E+00	2,6-dinitrotoluene	1.00E-01	1.00E+00
1,2-diphenylhydrazine	1.00E-01	1.00E+00	3,3-dichlorobenzidine	1.00E-01	1.00E+00
1,2,3-trichloropropane	1.00E-01	1.00E+00	4-chloroaniline	1.00E-01	1.00E+00
1,2,4-trichlorobenzene	1.00E-01	1.00E+00	4-methyl-2-pentanone	1.00E-01	1.00E+00
1,3-dichloropropene	1.00E-01	1.00E+00			
1,4-dichlorobenzene	1.00E-01	1.00E+00			

**Table B (cont.)**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Dermal Contact with Soils**

Compound	Non-Carcinogenic Calculation		
	CDI (mg/kg-d)	RfD (mg/kg-d)	UH (unitless)
1-butanol	NA	9.00E-01	NA
1,1-dichloroethane	4.53E-07	9.00E-01	5.03E-07
1,1-dichloroethene	4.53E-07	8.10E-03	5.59E-05
1,1,1,2-tetrachloroethane	4.53E-07	2.70E-02	1.68E-05
1,1,2-trichloroethane	4.53E-07	3.60E-02	1.26E-05
1,1,2,2-tetrachloroethane	4.53E-07	NA	NA
1,2-dibromo-3-chloropropane	4.53E-07	NA	NA
1,2-dibromoethane	4.53E-07	NA	NA
1,2-dichlorobenzene	4.53E-07	NA	NA
1,2-dichloroethane	4.53E-07	NA	NA
1,2-dichloropropane	4.53E-07	NA	NA
1,2-diphenylhydrazine	4.53E-07	NA	NA
1,2,3-trichloropropane	4.53E-07	5.40E-02	8.39E-06
1,2,4-trichlorobenzene	4.53E-07	9.00E-03	5.03E-05
1,3-dichloropropene	4.53E-07	2.70E-03	1.68E-04
1,4-dichlorobenzene	4.53E-07	NA	NA
2-butanone	4.53E-07	1.80E+00	2.52E-07
2-chlorophenol	4.53E-07	4.50E-02	1.01E-05
2-methylphenol	4.53E-07	4.50E-01	1.01E-06
2-naphthylamine	4.53E-07	NA	NA
2,4-dichlorophenol	4.53E-07	2.70E-03	1.68E-04
2,4-dimethylphenol	4.53E-07	1.80E-01	2.52E-06
2,4-dinitrophenol	4.53E-07	1.80E-03	2.52E-04
2,4-dinitrotoluene	4.53E-07	1.80E-03	2.52E-04
2,4,5-trichlorophenol	4.53E-07	9.00E-01	5.03E-07
2,4,6-trichlorophenol	4.53E-07	NA	NA
2,6-dinitrotoluene	4.53E-07	9.00E-03	5.03E-05
3,3-dichlorobenzidine	4.53E-07	NA	NA
4-chloroaniline	4.53E-07	3.60E-03	1.26E-04
4-methyl-2-pentanone	4.53E-07	7.20E-01	6.29E-07

Compound	Carcinogenic Calculation		
	CDI (mg/kg-d)	CSF (mg/kg-d)-1	UR (unitless)
1-butanol	NA	NA	NA
1,1-dichloroethane	5.32E-10	6.33E-03	3.37E-12
1,1-dichloroethene	5.32E-10	6.67E-01	3.55E-10
1,1,1,2-tetrachloroethane	5.32E-10	2.89E-02	1.54E-11
1,1,2-trichloroethane	5.32E-10	8.00E-02	4.25E-11
1,1,2,2-tetrachloroethane	5.32E-10	3.00E-01	1.60E-10
1,2-dibromo-3-chloropropane	5.32E-10	7.78E+00	4.14E-09
1,2-dibromoethane	5.32E-10	4.00E+00	2.13E-09
1,2-dichlorobenzene	5.32E-10	NA	NA
1,2-dichloroethane	5.32E-10	7.78E-02	4.14E-11
1,2-dichloropropane	5.32E-10	7.00E-02	3.72E-11
1,2-diphenylhydrazine	5.32E-10	9.67E-01	5.14E-10
1,2,3-trichloropropane	5.32E-10	7.78E+00	4.14E-09
1,2,4-trichlorobenzene	5.32E-10	NA	NA
1,3-dichloropropene	5.32E-10	2.00E-01	1.06E-10
1,4-dichlorobenzene	5.32E-10	4.44E-02	2.36E-11
2-butanone	5.32E-10	NA	NA
2-chlorophenol	5.32E-10	NA	NA
2-methylphenol	5.32E-10	NA	NA
2-naphthylamine	5.32E-10	2.00E+00	1.06E-09
2,4-dichlorophenol	5.32E-10	NA	NA
2,4-dimethylphenol	5.32E-10	NA	NA
2,4-dinitrophenol	5.32E-10	NA	NA
2,4-dinitrotoluene	5.32E-10	3.44E-01	1.83E-10
2,4,5-trichlorophenol	5.32E-10	NA	NA
2,4,6-trichlorophenol	5.32E-10	7.78E-02	4.14E-11
2,6-dinitrotoluene	5.32E-10	7.56E-01	4.02E-10
3,3-dichlorobenzidine	5.32E-10	1.33E+00	7.09E-10
4-chloroaniline	5.32E-10	NA	NA
4-methyl-2-pentanone	5.32E-10	NA	NA

**Table C**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Inhalation of Particulates and Volatiles**

$$\text{Intake Equation} = \frac{\text{CS} \times (\text{I}/\text{VF} + \text{I}/\text{PEF}) \times \text{EF} \times \text{ED} \times \text{ET} \times \text{IR}}{\text{BW} \times \text{AT}}$$

IR	Inhalation rate of gases (RAGS, 1989)	2.5E+00 m <sup>3</sup> /h
EF	Exposure frequency	2.0E+01 days/year
EDn	Exposure duration for non-carcinogens	8.2E-02 year
EDc	Exposure duration for carcinogens	8.2E-02 year
BW	Body weight	7.0E+01 kg
ATc	Average time for carcinogens (lifetime)	2.6E+04 days
ATn	Average time for non-carcinogens (EDn x 365)	3.0E+01 days
ET	Exposure time	1.0E+00 h/d
CS	Concentration of chemicals in soil	(see table below)
VF	Volatilization Factor	(see table below)
PEF	Particulate Emission Factor	(see table below)

**Chemical Concentrations**

Compound	VF (m <sup>3</sup> /kg)	PEF (m <sup>3</sup> /kg)	Cs (mg/kg)	Compound	VF (m <sup>3</sup> /kg)	PEF (m <sup>3</sup> /kg)	Cs (mg/kg)
1-butanol	3.9E+04	4.8E+09	1.0E+00	2-butane	2.0E+05	4.8E+09	1.0E+00
1,1-dichloroethane	4.5E+04	4.8E+09	1.0E+00	2-chlorophenol	1.1E+06	4.8E+09	1.0E+00
1,1-dichloroethene	4.1E+04	4.8E+09	1.0E+00	2-methylphenol	2.7E+06	4.8E+09	1.0E+00
1,1,1,2-tetrachloroethane	3.6E+05	4.8E+09	1.0E+00	2-naphthylamine	3.2E+07	4.8E+09	1.0E+00
1,1,2-trichloroethane	1.8E+05	4.8E+09	1.0E+00	2,4-dichlorophenol	6.0E+06	4.8E+09	1.0E+00
1,1,2,2-tetrachloroethane	3.8E+05	4.8E+09	1.0E+00	2,4-dimethylphenol	1.0E+07	4.8E+09	1.0E+00
1,2-dibromo-3-chloropropane	4.3E+05	4.8E+09	1.0E+00	2,4-dinitrophenol	1.3E+08	4.8E+09	1.0E+00
1,2-dibromoethane	1.3E+05	4.8E+09	1.0E+00	2,4-dinitrotoluene	2.9E+07	4.8E+09	1.0E+00
1,2-dichlorobenzene	4.7E+05	4.8E+09	1.0E+00	2,4,5-trichlorophenol	3.3E+06	4.8E+09	1.0E+00
1,2-dichloroethane	8.0E+04	4.8E+09	1.0E+00	2,4,6-trichlorophenol	1.6E+07	4.8E+09	1.0E+00
1,2-dichloropropane	9.3E+03	4.8E+09	1.0E+00	2,6-dinitrotoluene	1.0E+07	4.8E+09	1.0E+00
1,2-diphenylhydrazine	2.7E+08	4.8E+09	1.0E+00	3,3-dichlorobenzidine	5.6E+08	4.8E+09	1.0E+00
1,2,3-trichloropropane	3.2E+05	4.8E+09	1.0E+00	4-chloroaniline	2.8E+06	4.8E+09	1.0E+00
1,2,4-trichlorobenzene	2.0E+06	4.8E+09	1.0E+00	4-methyl-2-pentanone	3.8E+05	4.8E+09	1.0E+00
1,3-dichloropropene	1.1E+05	4.8E+09	1.0E+00				
1,4-dichlorobenzene	7.8E+05	4.8E+09	1.0E+00				

**Table C (cont.)**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Inhalation of Particulates and Volatiles**

Non-Carcinogenic Calculation				Carcinogenic Calculation			
Compound	CDI (mg/kg-d)	RfD (mg/kg-d)	UH (unitless)	Compound	CDI (mg/kg-d)	CSF (mg/kg-d) <sup>-1</sup>	UR (unitless)
1-butanol	5.0E-08	1.0E+00	5.0E-08	1-butanol	5.9E-11	NA	NA
1,1-dichloroethane	4.3E-08	1.4E+00	3.0E-08	1,1-dichloroethane	5.0E-11	5.7E-03	2.9E-13
1,1-dichloroethene	4.8E-08	9.0E-03	5.3E-06	1,1-dichloroethene	5.6E-11	1.2E+00	6.8E-11
1,1,1,2-tetrachloroethane	5.4E-09	3.0E-02	1.8E-07	1,1,1,2-tetrachloroethane	6.4E-12	2.6E-02	1.7E-13
1,1,2-trichloroethane	1.1E-08	4.0E-02	2.8E-07	1,1,2-trichloroethane	1.3E-11	7.2E-02	9.3E-13
1,1,2,2-tetrachloroethane	5.2E-09	NA	NA	1,1,2,2-tetrachloroethane	6.1E-12	2.7E-01	1.7E-12
1,2-dibromo-3-chloropropane	4.6E-09	5.7E-05	8.0E-05	1,2-dibromo-3-chloropropane	5.4E-12	7.0E+00	3.8E-11
1,2-dibromoethane	1.5E-08	5.7E-04	2.7E-05	1,2-dibromoethane	1.8E-11	2.5E-01	4.5E-12
1,2-dichlorobenzene	4.1E-09	NA	NA	1,2-dichlorobenzene	4.8E-12	NA	NA
1,2-dichloroethane	2.4E-08	NA	NA	1,2-dichloroethane	2.9E-11	7.0E-02	2.0E-12
1,2-dichloropropane	2.1E-07	3.7E-03	5.7E-05	1,2-dichloropropane	2.5E-10	6.3E-02	1.6E-11
1,2-diphenylhydrazine	7.7E-12	NA	NA	1,2-diphenylhydrazine	9.1E-15	8.7E-01	7.9E-15
1,2,3-trichloropropane	6.2E-09	6.0E-02	1.0E-07	1,2,3-trichloropropane	7.3E-12	7.0E+00	5.1E-11
1,2,4-trichlorobenzene	9.7E-10	5.7E-01	1.7E-09	1,2,4-trichlorobenzene	1.1E-12	NA	NA
1,3-dichloropropene	1.7E-08	5.7E-03	3.0E-06	1,3-dichloropropene	2.0E-11	5.5E-02	1.1E-12
1,4-dichlorobenzene	2.5E-09	7.1E-01	3.5E-09	1,4-dichlorobenzene	2.9E-12	4.0E-02	1.2E-13
2-butanone	9.8E-09	2.9E+00	3.4E-09	2-butanone	1.1E-11	NA	NA
2-chlorophenol	1.8E-09	5.0E-02	3.7E-08	2-chlorophenol	2.1E-12	NA	NA
2-methylphenol	7.2E-10	5.0E-01	1.4E-09	2-methylphenol	8.4E-13	NA	NA
2-naphthylamine	6.1E-11	NA	NA	2-naphthylamine	7.2E-14	1.8E+00	1.3E-13
2,4-dichlorophenol	3.3E-10	3.0E-03	1.1E-07	2,4-dichlorophenol	3.8E-13	NA	NA
2,4-dimethylphenol	1.9E-10	2.0E-01	9.5E-10	2,4-dimethylphenol	2.2E-13	NA	NA
2,4-dinitrophenol	1.5E-11	2.0E-03	7.6E-09	2,4-dinitrophenol	1.8E-14	NA	NA
2,4-dinitrotoluene	6.8E-11	2.0E-03	3.4E-08	2,4-dinitrotoluene	8.0E-14	3.1E-01	2.5E-14
2,4,5-trichlorophenol	5.9E-10	1.0E+00	5.9E-10	2,4,5-trichlorophenol	7.0E-13	NA	NA
2,4,6-trichlorophenol	1.2E-10	NA	NA	2,4,6-trichlorophenol	1.4E-13	7.0E-02	9.8E-15
2,6-dinitrotoluene	1.9E-10	1.0E-02	1.9E-08	2,6-dinitrotoluene	2.2E-13	6.8E-01	1.5E-13
3,3-dichlorobenzidine	3.9E-12	NA	NA	3,3-dichlorobenzidine	4.6E-15	1.2E+00	5.5E-15
4-chloroaniline	6.9E-10	4.0E-03	1.7E-07	4-chloroaniline	8.1E-13	NA	NA
4-methyl-2-pentanone	5.1E-09	2.3E-01	2.2E-08	4-methyl-2-pentanone	6.0E-12	NA	NA

**Table D**  
**Summary of Unit Risk Calculations**  
**Construction Worker**

**Chemicals of Concern**

1-butanol
1,1-dichloroethane
1,1-dichloroethene
1,1,1,2-tetrachloroethane
1,1,2-trichloroethane
1,1,2,2-tetrachloroethane
1,2-dibromo-3-chloropropane
1,2-dibromoethane
1,2-dichlorobenzene
1,2-dichloroethane
1,2-dichloropropane
1,2-diphenylhydrazine
1,2,3-trichloropropane
1,2,4-trichlorobenzene
1,3-dichloropropene
1,4-dichlorobenzene
2-butanone
2-chlorophenol
2-methylphenol
2-naphthylamine
2,4-dichlorophenol
2,4-dimethylphenol
2,4-dinitrophenol
2,4-dinitrotoluene
2,4,5-trichlorophenol
2,4,6-trichlorophenol
2,6-dinitrotoluene
3,3-dichlorobenzidine
4-chloroaniline
4-methyl-2-pentanone

Unit Hazard Quotient			
Soil			
Inhalation (unitless)	Dermal (unitless)	Ingestion (unitless)	Total (unitless)
4.98E-08	NA	3.75E-07	4.25E-07
3.01E-08	5.03E-07	3.75E-07	9.08E-07
5.34E-06	5.59E-05	4.17E-05	1.03E-04
1.81E-07	1.68E-05	1.25E-05	2.95E-05
2.75E-07	1.26E-05	9.37E-06	2.22E-05
NA	NA	NA	NA
8.01E-05	NA	NA	8.01E-05
2.71E-05	NA	NA	2.71E-05
NA	NA	NA	NA
NA	NA	NA	NA
5.67E-05	NA	NA	5.67E-05
NA	NA	NA	NA
1.03E-07	8.39E-06	6.25E-06	1.47E-05
1.70E-09	5.03E-05	3.75E-05	8.78E-05
3.05E-06	1.68E-04	1.25E-04	2.96E-04
3.50E-09	NA	NA	3.50E-09
3.42E-09	2.52E-07	1.87E-07	4.42E-07
3.66E-08	1.01E-05	7.50E-06	1.76E-05
1.44E-09	1.01E-06	7.50E-07	1.76E-06
NA	NA	NA	NA
1.08E-07	1.68E-04	1.25E-04	2.93E-04
9.48E-10	2.52E-06	1.87E-06	4.39E-06
7.60E-09	2.52E-04	1.87E-04	4.39E-04
3.42E-08	2.52E-04	1.87E-04	4.39E-04
5.95E-10	5.03E-07	3.75E-07	8.79E-07
NA	NA	NA	NA
1.89E-08	5.03E-05	3.75E-05	8.78E-05
NA	NA	NA	NA
1.74E-07	1.26E-04	9.37E-05	2.20E-04
2.24E-08	6.29E-07	4.69E-07	1.12E-06

Unit Incremental Lifetime Cancer Risk			
Soil			
Inhalation (unitless)	Dermal (unitless)	Ingestion (unitless)	Total (unitless)
NA	NA	NA	NA
2.88E-13	3.37E-12	2.51E-12	6.16E-12
6.77E-11	3.55E-10	2.64E-10	6.86E-10
1.65E-13	1.54E-11	1.14E-11	2.70E-11
9.30E-13	4.25E-11	3.17E-11	7.52E-11
1.65E-12	1.60E-10	1.19E-10	2.80E-10
3.76E-11	4.14E-09	3.08E-09	7.26E-09
4.54E-12	2.13E-09	1.58E-09	3.72E-09
NA	NA	NA	NA
2.01E-12	4.14E-11	3.08E-11	7.42E-11
1.56E-11	3.72E-11	2.77E-11	8.05E-11
7.87E-15	5.14E-10	3.83E-10	8.97E-10
5.09E-11	4.14E-09	3.08E-09	7.27E-09
NA	NA	NA	NA
1.12E-12	1.06E-10	7.92E-11	1.87E-10
1.18E-13	2.36E-11	1.76E-11	4.14E-11
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
1.30E-13	1.06E-09	7.92E-10	1.86E-09
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
2.49E-14	1.83E-10	1.36E-10	3.20E-10
NA	NA	NA	NA
9.82E-15	4.14E-11	3.08E-11	7.22E-11
1.51E-13	4.02E-10	2.99E-10	7.01E-10
5.48E-15	7.09E-10	5.28E-10	1.24E-09
NA	NA	NA	NA
NA	NA	NA	NA

**Table E**  
**Summary of Health-Based Soil Concentrations**  
**Via Construction Worker Scenario**

**Chemicals of Concern**

1-butanol
1,1-dichloroethane
1,1-dichloroethene
1,1,1,2-tetrachloroethane
1,1,2-trichloroethane
1,1,2,2-tetrachloroethane
1,2-dibromo-3-chloropropane
1,2-dibromoethane
1,2-dichlorobenzene
1,2-dichloroethane
1,2-dichloropropane
1,2-diphenylhydrazine
1,2,3-trichloropropane
1,2,4-trichlorobenzene
1,3-dichloropropene
1,4-dichlorobenzene
2-butanone
2-chlorophenol
2-methylphenol
2-naphthylamine
2,4-dichlorophenol
2,4-dimethylphenol
2,4-dinitrophenol
2,4-dinitrotoluene
2,4,5-trichlorophenol
2,4,6-trichlorophenol
2,6-dinitrotoluene
3,3-dichlorobenzidine
4-chloroaniline
4-methyl-2-pentanone

Hazard Quotient		
Soil (mg/kg)		
Total Unit HQ (unitless)	Scaled Soil Concentration HQ=0.2	Risk based Concentration HQ=0.2
4.25E-07	4.71E+05	4.71E+05
9.08E-07	2.20E+05	2.20E+05
1.03E-04	1.94E+03	1.94E+03
2.95E-05	6.79E+03	6.79E+03
2.22E-05	9.00E+03	9.00E+03
NA	NA	NA
8.01E-05	2.50E+03	2.50E+03
2.71E-05	7.38E+03	7.38E+03
NA	NA	NA
NA	NA	NA
5.67E-05	3.53E+03	3.53E+03
NA	NA	NA
1.47E-05	1.36E+04	1.36E+04
8.78E-05	2.28E+03	2.28E+03
2.96E-04	6.76E+02	6.76E+02
3.50E-09	5.71E+07	5.71E+07
4.42E-07	4.52E+05	4.52E+05
1.76E-05	1.14E+04	1.14E+04
1.76E-06	1.14E+05	1.14E+05
NA	NA	NA
2.93E-04	6.83E+02	6.83E+02
4.39E-06	4.55E+04	4.55E+04
4.39E-04	4.56E+02	4.56E+02
4.39E-04	4.55E+02	4.55E+02
8.79E-07	2.28E+05	2.28E+05
NA	NA	NA
8.78E-05	2.28E+03	2.28E+03
NA	NA	NA
2.20E-04	9.10E+02	9.10E+02
1.12E-06	1.79E+05	1.79E+05

Incremental Lifetime Cancer Risk		
Soil (mg/kg)		
Total Unit ILCR (unitless)	Scaled Soil Concentration ILCR=1E-06	Risk based Concentration ILCR=1E-06
NA	NA	NA
6.16E-12	1.62E+05	1.62E+05
6.86E-10	1.46E+03	1.46E+03
2.70E-11	3.71E+04	3.71E+04
7.52E-11	1.33E+04	1.33E+04
2.80E-10	3.57E+03	3.57E+03
7.26E-09	1.38E+02	1.38E+02
3.72E-09	2.69E+02	2.69E+02
NA	NA	NA
7.42E-11	1.35E+04	1.35E+04
8.05E-11	1.24E+04	1.24E+04
8.97E-10	1.11E+03	1.11E+03
7.27E-09	1.38E+02	1.38E+02
NA	NA	NA
1.87E-10	5.36E+03	5.36E+03
4.14E-11	2.42E+04	2.42E+04
NA	NA	NA
NA	NA	NA
NA	NA	NA
1.86E-09	5.39E+02	5.39E+02
NA	NA	NA
NA	NA	NA
NA	NA	NA
3.20E-10	3.13E+03	3.13E+03
NA	NA	NA
7.22E-11	1.39E+04	1.39E+04
7.01E-10	1.43E+03	1.43E+03
1.24E-09	8.08E+02	8.08E+02
NA	NA	NA
NA	NA	NA

**Table A**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Incidental Ingestion of Soils**

**Intake Equation** =  $\frac{CS \times EF \times ED \times CF \times IR}{BW \times AT}$

IRs	Ingestion rate of soil (RAGS, 1989)	480 mg/day
CF	Conversion factor	1.0E-06 kg/mg
EF	Exposure frequency	20 d/year
EDn	Exposure duration for non-carcinogens	0.082 year
EDc	Exposure duration for carcinogens	0.082 year
BW	Body weight	70 kg
ATc	Average time for carcinogens (lifetime)	25550 day
ATn	Average time for non-carcinogens (EDn x 365)	30 day
CS	Concentration of chemicals in soil	(see table below)

**Chemical Concentrations**

Compound	Concentration	Compound	Concentration
4-methylphenol	1.0E+00	barium	1.0E+00
4,4-ddd	1.0E+00	benzene	1.0E+00
4,4-dde	1.0E+00	benzidine	1.0E+00
4,4-ddt	1.0E+00	benzoic acid	1.0E+00
acenaphthene	1.0E+00	benzo(a)anthracene	1.0E+00
acetone	1.0E+00	benzo(a)pyrene	1.0E+00
acrolein	1.0E+00	benzo(b)fluoranthene	1.0E+00
acrylonitrile	1.0E+00	benzo(k)fluoranthene	1.0E+00
aldrin	1.0E+00	benzyl alcohol	1.0E+00
alpha-bhc	1.0E+00	benzyl chloride	1.0E+00
aniline	1.0E+00	beryllium	1.0E+00
anthracene	1.0E+00	beta-bhc	1.0E+00
antimony	1.0E+00	beta-chloronaphthalene	1.0E+00
aroclor 1016	1.0E+00	bis(2-chloro-1-methylethyl)ether	1.0E+00
aroclor 1254	1.0E+00		
arsenic	1.0E+00		

**Table A (cont.)**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Incidental Ingestion of Soils**

Non-Carcinogenic Calculation			
Compound	CDI (mg/kg-d)	RfD (mg/kg-d)	UH (unitless)
4-methylphenol	3.75E-07	5.00E-03	7.50E-05
4,4-ddd	3.75E-07	NA	NA
4,4-dde	3.75E-07	NA	NA
4,4-ddt	3.75E-07	5.00E-04	7.50E-04
acenaphthene	3.75E-07	6.00E-01	6.25E-07
acetone	3.75E-07	1.00E+00	3.75E-07
acrolein	3.75E-07	NA	NA
acrylonitrile	3.75E-07	1.00E-02	3.75E-05
aldrin	3.75E-07	3.00E-05	1.25E-02
alpha-bhc	3.75E-07	NA	NA
aniline	3.75E-07	NA	NA
anthracene	3.75E-07	3.00E-01	1.25E-06
antimony	3.75E-07	4.00E-04	9.37E-04
aroclor 1016	3.75E-07	NA	NA
aroclor 1254	3.75E-07	5.00E-05	7.50E-03
arsenic	3.75E-07	3.00E-04	1.25E-03
barium	3.75E-07	7.00E-02	5.36E-06
benzene	3.75E-07	NA	NA
benzidine	3.75E-07	3.00E-03	1.25E-04
benzoic acid	3.75E-07	4.00E+00	9.37E-08
benzo(a)anthracene	3.75E-07	NA	NA
benzo(a)pyrene	3.75E-07	NA	NA
benzo(b)fluoranthene	3.75E-07	NA	NA
benzo(k)fluoranthene	3.75E-07	NA	NA
benzyl alcohol	3.75E-07	1.00E+00	3.75E-07
benzyl chloride	3.75E-07	NA	NA
beryllium	3.75E-07	5.00E-03	7.50E-05
beta-bhc	3.75E-07	NA	NA
beta-chloronaphthalene	3.75E-07	NA	NA
bis(2-chloro-1-methylethyl)ether	3.75E-07	NA	NA

Carcinogenic Calculation			
Compound	CDI (mg/kg-d)	CSF (mg/kg-d)-1	UR (unitless)
4-methylphenol	4.40E-10	NA	NA
4,4-ddd	4.40E-10	2.40E-01	1.06E-10
4,4-dde	4.40E-10	3.40E-01	1.50E-10
4,4-ddt	4.40E-10	3.40E-01	1.50E-10
acenaphthene	4.40E-10	NA	NA
acetone	4.40E-10	NA	NA
acrolein	4.40E-10	NA	NA
acrylonitrile	4.40E-10	1.00E+00	4.40E-10
aldrin	4.40E-10	1.70E+01	7.48E-09
alpha-bhc	4.40E-10	6.30E+00	2.77E-09
aniline	4.40E-10	5.70E-03	2.51E-12
anthracene	4.40E-10	NA	NA
antimony	4.40E-10	NA	NA
aroclor 1016	4.40E-10	NA	NA
aroclor 1254	4.40E-10	NA	NA
arsenic	4.40E-10	1.50E+00	6.60E-10
barium	4.40E-10	NA	NA
benzene	4.40E-10	1.00E-01	4.40E-11
benzidine	4.40E-10	5.00E+02	2.20E-07
benzoic acid	4.40E-10	NA	NA
benzo(a)anthracene	4.40E-10	1.20E+00	5.28E-10
benzo(a)pyrene	4.40E-10	1.20E+01	5.28E-09
benzo(b)fluoranthene	4.40E-10	1.20E+00	5.28E-10
benzo(k)fluoranthene	4.40E-10	1.20E+00	5.28E-10
benzyl alcohol	4.40E-10	NA	NA
benzyl chloride	4.40E-10	1.70E-01	7.48E-11
beryllium	4.40E-10	NA	NA
beta-bhc	4.40E-10	1.80E+00	7.92E-10
beta-chloronaphthalene	4.40E-10	NA	NA
bis(2-chloro-1-methylethyl)ether	4.40E-10	7.00E-02	3.08E-11

**Table B**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Dermal Contact with Soils**

**Intake Equation** = CS\_X\_CFX\_EFX\_EDX\_AFX\_ABS\_X\_SA  
BW X AT

SA	Surface area of exposed skin (50th percentile, hands only)	5800 cm <sup>2</sup> /day
AF	Adherence Factor	1 mg/cm <sup>2</sup>
ABS	Absorption factor (see table below)	csv
CF	Conversion factor	1.0E-06 kg/mg
EF	Exposure frequency	20 d/year
EDn	Exposure duration for non-carcinogens	0 year
EDc	Exposure duration for carcinogens	0 year
BW	Body weight	70 kg
ATc	Average time for carcinogens (lifetime)	25550 day
ATn	Average time for non-carcinogens (EDn x 365)	30 day
CS	Concentration of chemicals in soil (see table below)	csv

#### Chemical Concentrations

Compound	ABS (unitless)	Concentration (mg/kg)	Compound	ABS (unitless)	Concentration (mg/kg)
4-methylphenol	1.00E-01	1.00E+00	barium	1.00E-02	1.00E+00
4,4-ddd	5.00E-02	1.00E+00	benzene	1.00E-01	1.00E+00
4,4-dde	5.00E-02	1.00E+00	benzidine	1.00E-01	1.00E+00
4,4-ddt	5.00E-02	1.00E+00	benzoic acid	1.00E-01	1.00E+00
acenaphthene	1.50E-01	1.00E+00	benzo(a)anthracene	1.50E-01	1.00E+00
acetone	1.00E-01	1.00E+00	benzo(a)pyrene	1.50E-01	1.00E+00
acrolein	1.00E-01	1.00E+00	benzo(b)fluoranthene	1.50E-01	1.00E+00
acrylonitrile	1.00E-01	1.00E+00	benzo(k)fluoranthene	1.50E-01	1.00E+00
aldrin	5.00E-02	1.00E+00	benzyl alcohol	1.00E-01	1.00E+00
alpha-bhc	5.00E-02	1.00E+00	benzyl chloride	1.00E-01	1.00E+00
aniline	1.00E-01	1.00E+00	beryllium	1.00E-02	1.00E+00
anthracene	1.50E-01	1.00E+00	beta-bhc	5.00E-02	1.00E+00
antimony	1.00E-02	1.00E+00	beta-chloronaphthalene	1.00E-01	1.00E+00
aroclor 1016	1.00E-01	1.00E+00	bis(2-chloro-1-methylethyl)ether	1.00E-01	1.00E+00
aroclor 1254	1.00E-01	1.00E+00			
arsenic	3.00E-02	1.00E+00			

**Table B (cont.)**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Dermal Contact with Soils**

Compound	Non-Carcinogenic Calculation		
	CDI (mg/kg-d)	RfD (mg/kg-d)	UH (unitless)
4-methylphenol	4.53E-07	4.50E-03	1.01E-04
4,4-ddd	2.26E-07	NA	NA
4,4-dde	2.26E-07	NA	NA
4,4-ddt	2.26E-07	4.50E-04	5.03E-04
acenaphthene	6.79E-07	5.40E-01	1.26E-06
acetone	4.53E-07	9.00E-01	5.03E-07
acrolein	4.53E-07	NA	NA
acrylonitrile	4.53E-07	9.00E-03	5.03E-05
aldrin	2.26E-07	2.70E-05	8.39E-03
alpha-bhc	2.26E-07	NA	NA
aniline	4.53E-07	NA	NA
anthracene	6.79E-07	2.70E-01	2.52E-06
antimony	4.53E-08	6.00E-05	7.55E-04
aroclor 1016	4.53E-07	NA	NA
aroclor 1254	4.53E-07	4.50E-05	1.01E-02
arsenic	1.36E-07	2.85E-04	4.77E-04
barium	4.53E-08	6.37E-02	7.11E-07
benzene	4.53E-07	NA	NA
benzidine	4.53E-07	2.70E-03	1.68E-04
benzoic acid	4.53E-07	3.60E+00	1.26E-07
benzo(a)anthracene	6.79E-07	NA	NA
benzo(a)pyrene	6.79E-07	NA	NA
benzo(b)fluoranthene	6.79E-07	NA	NA
benzo(k)fluoranthene	6.79E-07	NA	NA
benzyl alcohol	4.53E-07	9.00E-01	5.03E-07
benzyl chloride	4.53E-07	NA	NA
beryllium	4.53E-08	5.00E-05	9.06E-04
beta-bhc	2.26E-07	NA	NA
beta-chloronaphthalene	4.53E-07	NA	NA
bis(2-chloro-1-methylethyl)ether	4.53E-07	NA	NA

Compound	Carcinogenic Calculation		
	CDI (mg/kg-d)	CSF (mg/kg-d) <sup>-1</sup>	UR (unitless)
4-methylphenol	5.32E-10	NA	NA
4,4-ddd	2.66E-10	2.67E-01	7.09E-11
4,4-dde	2.66E-10	3.78E-01	1.00E-10
4,4-ddt	2.66E-10	3.78E-01	1.00E-10
acenaphthene	7.98E-10	NA	NA
acetone	5.32E-10	NA	NA
acrolein	5.32E-10	NA	NA
acrylonitrile	5.32E-10	1.11E+00	5.91E-10
aldrin	2.66E-10	1.89E+01	5.02E-09
alpha-bhc	2.66E-10	7.00E+00	1.86E-09
aniline	5.32E-10	6.33E-03	3.37E-12
anthracene	7.98E-10	NA	NA
antimony	5.32E-11	NA	NA
aroclor 1016	5.32E-10	NA	NA
aroclor 1254	5.32E-10	NA	NA
arsenic	1.60E-10	1.58E+00	2.52E-10
barium	5.32E-11	NA	NA
benzene	5.32E-10	1.11E-01	5.91E-11
benzidine	5.32E-10	5.56E+02	2.95E-07
benzoic acid	5.32E-10	NA	NA
benzo(a)anthracene	7.98E-10	1.33E+00	1.06E-09
benzo(a)pyrene	7.98E-10	1.33E+01	1.06E-08
benzo(b)fluoranthene	7.98E-10	1.33E+00	1.06E-09
benzo(k)fluoranthene	7.98E-10	1.33E+00	1.06E-09
benzyl alcohol	5.32E-10	NA	NA
benzyl chloride	5.32E-10	1.89E-01	1.00E-10
beryllium	5.32E-11	NA	NA
beta-bhc	2.66E-10	2.00E+00	5.32E-10
beta-chloronaphthalene	5.32E-10	NA	NA
bis(2-chloro-1-methylethyl)ether	5.32E-10	7.78E-02	4.14E-11

**Table C**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Inhalation of Particulates and Volatiles**

$$\text{Intake Equation} = \frac{\text{CS} \times (\text{I}/\text{VF} + 1/\text{PEF}) \times \text{EF} \times \text{ED} \times \text{ET} \times \text{IR}}{\text{BW} \times \text{AT}}$$

IR	Inhalation rate of gases (RAGS, 1989)	2.5E+00 m/h
EF	Exposure frequency	2.0E+01 days/year
EDn	Exposure duration for non-carcinogens	8.2E-02 year
EDc	Exposure duration for carcinogens	8.2E-02 year
BW	Body weight	7.0E+01 kg
ATc	Average time for carcinogens (lifetime)	2.6E+04 days
ATn	Average time for non-carcinogens (EDn x 365)	3.0E+01 days
ET	Exposure time	1.0E+00 h/d
CS	Concentration of chemicals in soil	(see table below)
VF	Volatilization Factor	(see table below)
PEF	Particulate Emission Factor	(see table below)

**Chemical Concentrations**

Compound	VF (m <sup>3</sup> /kg)	PEF (m <sup>3</sup> /kg)	Cs (mg/kg)	Compound	VF (m <sup>3</sup> /kg)	PEF (m <sup>3</sup> /kg)	Cs (mg/kg)
4-methylphenol	6.3E+06	4.8E+09	1.0E+00	barium	NA	4.8E+09	1.0E+00
4,4-dde	2.9E+08	4.8E+09	1.0E+00	benzene	7.6E+04	4.8E+09	1.0E+00
4,4-dde	1.8E+07	4.8E+09	1.0E+00	benzidine	5.2E+06	4.8E+09	1.0E+00
4,4-ddt	1.6E+08	4.8E+09	1.0E+00	benzo(a)acid	9.0E+06	4.8E+09	1.0E+00
acenaphthene	3.6E+06	4.8E+09	1.0E+00	benzo(a)anthracene	3.9E+08	4.8E+09	1.0E+00
acetone	1.5E+05	4.8E+09	1.0E+00	benzo(a)pyrene	3.6E+08	4.8E+09	1.0E+00
acrolein	2.6E+05	4.8E+09	1.0E+00	benzo(b)fluoranthene	2.1E+08	4.8E+09	1.0E+00
acrylonitrile	1.6E+05	4.8E+09	1.0E+00	benzo(k)fluoranthene	1.1E+08	4.8E+09	1.0E+00
aldrin	1.3E+07	4.8E+09	1.0E+00	benzyl alcohol	2.5E+06	4.8E+09	1.0E+00
alpha-bhc	2.3E+07	4.8E+09	1.0E+00	benzyl chloride	4.9E+05	4.8E+09	1.0E+00
aniline	1.3E+07	4.8E+09	1.0E+00	beryllium	NA	4.8E+09	1.0E+00
anthracene	1.5E+07	4.8E+09	1.0E+00	beta-bhc	7.9E+07	4.8E+09	1.0E+00
antimony	NA	4.8E+09	1.0E+00	beta-chloronaphthalene	1.2E+06	4.8E+09	1.0E+00
aroclor 1016	7.2E+06	4.8E+09	1.0E+00	bis(2-chloro-1-methylethyl)et	6.0E+05	4.8E+09	1.0E+00
aroclor 1254	1.2E+07	4.8E+09	1.0E+00				
arsenic	NA	4.8E+09	1.0E+00				

**Table C (cont.)**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Inhalation of Particulates and Volatiles**

Compound	Non-Carcinogenic Calculation		
	CDI (mg/kg-d)	RfD (mg/kg-d)	UH (unitless)
4-methylphenol	3.1E-10	5.0E-03	6.3E-08
4,4-ddd	7.2E-12	NA	NA
4,4-dde	1.1E-10	NA	NA
4,4-ddt	1.2E-11	5.0E-04	2.5E-08
acenaphthene	5.4E-10	6.0E-01	9.0E-10
acetone	1.3E-08	1.0E+00	1.3E-08
acrolein	7.5E-09	NA	NA
acrylonitrile	1.2E-08	1.0E-02	1.2E-06
aldrin	1.5E-10	3.0E-05	5.1E-06
alpha-bhc	8.7E-11	NA	NA
aniline	1.5E-10	2.9E-04	5.2E-07
anthracene	1.3E-10	3.0E-01	4.4E-10
antimony	4.1E-13	4.0E-04	1.0E-09
aroclor 1016	2.7E-10	NA	NA
aroclor 1254	1.7E-10	5.0E-05	3.3E-06
arsenic	4.1E-13	3.0E-04	1.4E-09
barium	4.1E-13	1.4E-03	2.9E-10
benzene	2.6E-08	NA	NA
benzidine	3.8E-10	3.0E-03	1.3E-07
benzoic acid	2.2E-10	4.0E+00	5.5E-11
benzo(a)anthracene	5.4E-12	NA	NA
benzo(a)pyrene	5.8E-12	NA	NA
benzo(b)fluoranthene	9.8E-12	NA	NA
benzo(k)fluoranthene	1.8E-11	NA	NA
benzyl alcohol	7.9E-10	1.0E+00	7.9E-10
benzyl chloride	4.0E-09	NA	NA
beryllium	4.1E-13	5.0E-03	8.2E-11
beta-bhc	2.5E-11	NA	NA
beta-chloronaphthalene	1.6E-09	NA	NA
bis(2-chloro-1-methylethyl)ether	3.3E-09	NA	NA

Compound	Carcinogenic Calculation		
	CDI (mg/kg-d)	CSF (mg/kg-d) <sub>-1</sub>	UR (unitless)
4-methylphenol	3.7E-13	NA	NA
4,4-ddd	8.4E-15	2.4E-01	2.0E-15
4,4-dde	1.3E-13	3.4E-01	4.3E-14
4,4-ddt	1.4E-14	3.4E-01	4.9E-15
acenaphthene	6.3E-13	NA	NA
acetone	1.6E-11	NA	NA
acrolein	8.8E-12	NA	NA
acrylonitrile	1.4E-11	1.0E+00	1.4E-11
aldrin	1.8E-13	1.7E+01	3.0E-12
alpha-bhc	1.0E-13	6.3E+00	6.4E-13
aniline	1.7E-13	5.7E-03	9.9E-16
anthracene	1.5E-13	NA	NA
antimony	4.8E-16	NA	NA
aroclor 1016	3.2E-13	NA	NA
aroclor 1254	2.0E-13	NA	NA
arsenic	4.8E-16	1.2E+01	5.8E-15
barium	4.8E-16	NA	NA
benzene	3.0E-11	1.0E-01	3.0E-12
benzidine	4.4E-13	5.0E+02	2.2E-10
benzoic acid	2.6E-13	NA	NA
benzo(a)anthracene	6.3E-15	3.9E-01	2.5E-15
benzo(a)pyrene	6.8E-15	3.9E+00	2.7E-14
benzo(b)fluoranthene	1.1E-14	3.9E-01	4.5E-15
benzo(k)fluoranthene	2.1E-14	3.9E-01	8.0E-15
benzyl alcohol	9.2E-13	NA	NA
benzyl chloride	4.7E-12	1.7E-01	8.0E-13
beryllium	4.8E-16	8.4E+00	4.0E-15
beta-bhc	3.0E-14	1.8E+00	5.3E-14
beta-chloronaphthalene	1.9E-12	NA	NA
bis(2-chloro-1-methylethyl)ether	3.8E-12	3.5E-02	1.3E-13

**Table D**  
**Summary of Unit Risk Calculations**  
**Construction Worker**

**Chemicals of Concern**

4-methylphenol
4,4-ddd
4,4-dde
4,4-ddt
acenaphthene
acetone
acrolein
acrylonitrile
aldrin
alpha-bhc
aniline
anthracene
antimony
aroclor 1016
aroclor 1254
arsenic
barium
benzene
benzidine
benzoic acid
benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(k)fluoranthene
benzyl alcohol
benzyl chloride
beryllium
beta-bhc
beta-chloronaphthalene
bis(2-chloro-1-methylethyl)ether

Unit Hazard Quotient			
Soil			
Inhalation (unitless)	Dermal (unitless)	Ingestion (unitless)	Total (unitless)
6.25E-08	1.01E-04	7.50E-05	1.76E-04
NA	NA	NA	NA
NA	NA	NA	NA
2.47E-08	5.03E-04	7.50E-04	1.25E-03
8.97E-10	1.26E-06	6.25E-07	1.88E-06
1.34E-08	5.03E-07	3.75E-07	8.92E-07
NA	NA	NA	NA
1.20E-06	5.03E-05	3.75E-05	8.90E-05
5.05E-06	8.39E-03	1.25E-02	2.09E-02
NA	NA	NA	NA
5.19E-07	NA	NA	5.19E-07
4.37E-10	2.52E-06	1.25E-06	3.77E-06
1.02E-09	7.55E-04	9.37E-04	1.69E-03
NA	NA	NA	NA
3.32E-06	1.01E-02	7.50E-03	1.76E-02
1.36E-09	4.77E-04	1.25E-03	1.73E-03
2.86E-10	7.11E-07	5.36E-06	6.07E-06
NA	NA	NA	NA
1.25E-07	1.68E-04	1.25E-04	2.93E-04
5.46E-11	1.26E-07	9.37E-08	2.20E-07
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
7.85E-10	5.03E-07	3.75E-07	8.79E-07
NA	NA	NA	NA
8.18E-11	9.06E-04	7.50E-05	9.81E-04
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA

Unit Incremental Lifetime Cancer Risk			
Soil			
Inhalation (unitless)	Dermal (unitless)	Ingestion (unitless)	Total (unitless)
NA	NA	NA	NA
2.02E-15	7.09E-11	1.06E-10	1.77E-10
4.28E-14	1.00E-10	1.50E-10	2.50E-10
4.92E-15	1.00E-10	1.50E-10	2.50E-10
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
1.41E-11	5.91E-10	4.40E-10	1.05E-09
3.03E-12	5.02E-09	7.48E-09	1.25E-08
6.43E-13	1.86E-09	2.77E-09	4.64E-09
9.93E-16	3.37E-12	2.51E-12	5.88E-12
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
5.76E-15	2.52E-10	6.60E-10	9.12E-10
NA	NA	NA	NA
3.00E-12	5.91E-11	4.40E-11	1.06E-10
2.21E-10	2.95E-07	2.20E-07	5.16E-07
NA	NA	NA	NA
2.47E-15	1.06E-09	5.28E-10	1.59E-09
2.67E-14	1.06E-08	5.28E-09	1.59E-08
4.48E-15	1.06E-09	5.28E-10	1.59E-09
8.03E-15	1.06E-09	5.28E-10	1.59E-09
NA	NA	NA	NA
7.99E-13	1.00E-10	7.48E-11	1.76E-10
4.03E-15	NA	NA	4.03E-15
5.31E-14	5.32E-10	7.92E-10	1.32E-09
NA	NA	NA	NA
1.34E-13	4.14E-11	3.08E-11	7.23E-11

**Table E**  
**Summary of Health-Based Soil Concentrations**  
**Via Construction Worker Scenario**

**Chemicals of Concern**

Chemical
4-methylphenol
4,4-ddd
4,4-dde
4,4-ddt
acenaphthene
acetone
acrolein
acrylonitrile
aldrin
alpha-bhc
aniline
anthracene
antimony
aroclor 1016
aroclor 1254
arsenic
barium
benzene
benzidine
benzoic acid
benzo(a)anthracene
benzo(a)pyrene
benzo(b)fluoranthene
benzo(k)fluoranthene
benzyl alcohol
benzyl chloride
beryllium
beta-bhc
beta-chloronaphthalene
bis(2-chloro-1-methylethyl)ether

**Hazard Quotient**

	Soil (mg/kg)		
	Total Unit HQ (unitless)	Scaled Soil Concentration HQ=0.2	Risk based Concentration HQ=0.2
4-methylphenol	1.76E-04	1.14E+03	1.14E+03
4,4-ddd	NA	NA	NA
4,4-dde	NA	NA	NA
4,4-ddt	1.25E-03	1.60E+02	1.60E+02
acenaphthene	1.88E-06	1.06E+05	1.06E+05
acetone	8.92E-07	2.24E+05	2.24E+05
acrolein	NA	NA	NA
acrylonitrile	8.90E-05	2.25E+03	2.25E+03
aldrin	2.09E-02	9.57E+00	9.57E+00
alpha-bhc	NA	NA	NA
aniline	5.19E-07	3.85E+05	3.85E+05
anthracene	3.77E-06	5.31E+04	5.31E+04
antimony	1.69E-03	1.18E+02	1.18E+02
aroclor 1016	NA	NA	NA
aroclor 1254	1.76E-02	1.14E+01	1.14E+01
arsenic	1.73E-03	1.16E+02	1.16E+02
barium	6.07E-06	3.30E+04	3.30E+04
benzene	NA	NA	NA
benzidine	2.93E-04	6.83E+02	6.83E+02
benzoic acid	2.20E-07	9.11E+05	9.11E+05
benzo(a)anthracene	NA	NA	NA
benzo(a)pyrene	NA	NA	NA
benzo(b)fluoranthene	NA	NA	NA
benzo(k)fluoranthene	NA	NA	NA
benzyl alcohol	8.79E-07	2.28E+05	2.28E+05
benzyl chloride	NA	NA	NA
beryllium	9.81E-04	2.04E+02	2.04E+02
beta-bhc	NA	NA	NA
beta-chloronaphthalene	NA	NA	NA
bis(2-chloro-1-methylethyl)ether	NA	NA	NA

**Incremental Lifetime Cancer Risk**

	Soil (mg/kg)		
	Total Unit ILCR (unitless)	Scaled Soil Concentration ILCR=1E-06	Risk based Concentration ILCR=1E-06
4-methylphenol	NA	NA	NA
4,4-ddd	1.77E-10	5.66E+03	5.66E+03
4,4-dde	2.50E-10	4.00E+03	4.00E+03
4,4-ddt	2.50E-10	4.00E+03	4.00E+03
acenaphthene	NA	NA	NA
acetone	NA	NA	NA
acrolein	NA	NA	NA
acrylonitrile	1.05E-09	9.57E+02	9.57E+02
aldrin	1.25E-08	7.99E+01	7.99E+01
alpha-bhc	4.64E-09	2.16E+02	2.16E+02
aniline	5.88E-12	1.70E+05	1.70E+05
anthracene	NA	NA	NA
antimony	NA	NA	NA
aroclor 1016	NA	NA	NA
aroclor 1254	9.12E-10	1.10E+03	1.10E+03
arsenic	NA	NA	NA
barium	1.06E-10	9.42E+03	9.42E+03
benzene	5.16E-07	1.94E+00	1.94E+00
benzidine	NA	NA	NA
benzoic acid	1.59E-09	6.28E+02	6.28E+02
benzo(a)anthracene	1.59E-08	6.28E+01	6.28E+01
benzo(a)pyrene	1.59E-09	6.28E+02	6.28E+02
benzo(b)fluoranthene	1.59E-09	6.28E+02	6.28E+02
benzo(k)fluoranthene	NA	NA	NA
benzyl alcohol	NA	NA	NA
benzyl chloride	1.76E-10	5.68E+03	5.68E+03
beryllium	4.03E-15	2.48E+08	2.48E+08
beta-bhc	1.32E-09	7.55E+02	7.55E+02
beta-chloronaphthalene	NA	NA	NA
bis(2-chloro-1-methylethyl)ether	7.23E-11	1.38E+04	1.38E+04

**Table A**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Incidental Ingestion of Soils**

**Intake Equation** = 
$$\frac{CS \times EF \times ED \times CF \times IR}{BW \times AT}$$

IRs	Ingestion rate of soil (RAGS, 1989)	480 mg/day
CF	Conversion factor	1.0E-06 kg/mg
EF	Exposure frequency	20 d/year
EDn	Exposure duration for non-carcinogens	0.082 year
EDc	Exposure duration for carcinogens	0.082 year
BW	Body weight	70 kg
ATc	Average time for carcinogens (lifetime)	25550 day
ATn	Average time for non-carcinogens (EDn x 365)	30 day
CS	Concentration of chemicals in soil (see table below)	

**Chemical Concentrations**

Compound	Concentration	Compound	Concentration
bis(2-chloroethyl)ether	1.0E+00	cis-1,2-dichloroethene	1.0E+00
bis(2-ethylhexyl)phthalate	1.0E+00	copper	1.0E+00
bromodichloromethane	1.0E+00	cumene	1.0E+00
bromoform	1.0E+00	cyanide	1.0E+00
bromomethane	1.0E+00	dibenz(a,h)anthracene	1.0E+00
cadmium	1.0E+00	dibromochloromethane	1.0E+00
carbazole	1.0E+00	dichlorodifluoromethane	1.0E+00
carbon disulfide	1.0E+00	dieffdrin	1.0E+00
carbon tetrachloride	1.0E+00	diethyl phthalate	1.0E+00
chlordane	1.0E+00	di-n-butylphthalate	1.0E+00
chlorobenzene	1.0E+00	di-n-octylphthalate	1.0E+00
chloroform	1.0E+00	endosulfan	1.0E+00
chloromethane	1.0E+00	endrin	1.0E+00
chromium iii	1.0E+00	ethyl chloride	1.0E+00
chromium vi	1.0E+00		
chrysene	1.0E+00		

**Table A (cont.)**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Incidental Ingestion of Soils**

Non-Carcinogenic Calculation			
Compound	CDI (mg/kg-d)	RfD (mg/kg-d)	UH (unitless)
bis(2-chloroethyl)ether	3.75E-07	NA	NA
bis(2-ethylhexyl)phthalate	3.75E-07	NA	NA
bromodichloromethane	3.75E-07	2.00E-02	1.87E-05
bromoform	3.75E-07	2.00E-02	1.87E-05
bromomethane	3.75E-07	NA	NA
cadmium	3.75E-07	5.00E-04	7.50E-04
carbazole	3.75E-07	NA	NA
carbon disulfide	3.75E-07	1.00E-01	3.75E-06
carbon tetrachloride	3.75E-07	NA	NA
chlordanne	3.75E-07	6.00E-05	6.25E-03
chlorobenzene	3.75E-07	NA	NA
chloroform	3.75E-07	1.00E-02	3.75E-05
chloromethane	3.75E-07	NA	NA
chromium iii	3.75E-07	1.00E+00	3.75E-07
chromium vi	3.75E-07	2.00E-02	1.87E-05
chrysene	3.75E-07	NA	NA
cis-1,2-dichloroethene	3.75E-07	1.00E-01	3.75E-06
copper	3.75E-07	3.70E-02	1.01E-05
cumene	3.75E-07	4.00E-01	9.37E-07
cyanide	3.75E-07	2.00E-02	1.87E-05
dibenzo(a,h)anthracene	3.75E-07	NA	NA
dibromochloromethane	3.75E-07	2.00E-01	1.87E-06
dichlorodifluoromethane	3.75E-07	9.00E-01	4.17E-07
dieldrin	3.75E-07	5.00E-05	7.50E-03
diethyl phthalate	3.75E-07	8.00E+00	4.69E-08
di-n-butylphthalate	3.75E-07	1.00E+00	3.75E-07
di-n-octylphthalate	3.75E-07	2.00E-02	1.87E-05
endosulfan	3.75E-07	6.00E-03	6.25E-05
endrin	3.75E-07	3.00E-04	1.25E-03
ethyl chloride	3.75E-07	NA	NA

Carcinogenic Calculation			
Compound	CDI (mg/kg-d)	CSF (mg/kg-d)-1	UR (unitless)
bis(2-chloroethyl)ether	4.40E-10	2.50E+00	1.10E-09
bis(2-ethylhexyl)phthalate	4.40E-10	8.40E-03	3.70E-12
bromodichloromethane	4.40E-10	1.30E-01	5.72E-11
bromoform	4.40E-10	7.93E-03	3.49E-12
bromomethane	4.40E-10	NA	NA
cadmium	4.40E-10	NA	NA
carbazole	4.40E-10	2.00E-02	8.80E-12
carbon disulfide	4.40E-10	NA	NA
carbon tetrachloride	4.40E-10	1.50E-01	6.60E-11
chlordanne	4.40E-10	1.20E+00	5.28E-10
chlorobenzene	4.40E-10	NA	NA
chloroform	4.40E-10	3.10E-02	1.36E-11
chloromethane	4.40E-10	1.30E-02	5.72E-12
chromium iii	4.40E-10	NA	NA
chromium vi	4.40E-10	4.20E-01	1.85E-10
chrysene	4.40E-10	1.20E-01	5.28E-11
cis-1,2-dichloroethene	4.40E-10	NA	NA
copper	4.40E-10	NA	NA
cumene	4.40E-10	NA	NA
cyanide	4.40E-10	NA	NA
dibenzo(a,h)anthracene	4.40E-10	4.10E+00	1.80E-09
dibromochloromethane	4.40E-10	9.40E-02	4.14E-11
dichlorodifluoromethane	4.40E-10	NA	NA
dieldrin	4.40E-10	1.60E+01	7.04E-09
diethyl phthalate	4.40E-10	NA	NA
di-n-butylphthalate	4.40E-10	NA	NA
di-n-octylphthalate	4.40E-10	NA	NA
endosulfan	4.40E-10	NA	NA
endrin	4.40E-10	NA	NA
ethyl chloride	4.40E-10	NA	NA

**Table B**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Dermal Contact with Soils**

**Intake Equation** =  $CS \times CF \times EF \times ED \times AF \times ABS \times SA$   
 $BW \times AT$

SA	Surface area of exposed skin (50th percentile, hands only)	5800 cm <sup>2</sup> /day
AF	Adherence Factor	1 mg/cm <sup>2</sup>
ABS	Absorption factor (see table below)	csv
CF	Conversion factor	1.0E-06 kg/mg
EF	Exposure frequency	20 d/year
EDn	Exposure duration for non-carcinogens	0 year
EDc	Exposure duration for carcinogens	0 year
BW	Body weight	70 kg
ATc	Average time for carcinogens (lifetime)	25550 day
ATn	Average time for non-carcinogens (EDn x 365)	30 day
CS	Concentration of chemicals in soil (see table below)	csv

**Chemical Concentrations**

Compound	ABS (unitless)	Concentration (mg/kg)	Compound	ABS (unitless)	Concentration (mg/kg)
bis(2-chloroethyl)ether	1.00E-01	1.00E+00	cis-1,2-dichloroethene	1.00E-01	1.00E+00
bis(2-ethylhexyl)phthalate	1.00E-01	1.00E+00	copper	1.00E-02	1.00E+00
bromodichloromethane	1.00E-01	1.00E+00	cumene	1.00E-01	1.00E+00
bromoform	1.00E-01	1.00E+00	cyanide	1.00E-02	1.00E+00
bromomethane	1.00E-01	1.00E+00	dibenzo(a,h)anthracene	1.50E-01	1.00E+00
cadmium	1.00E-03	1.00E+00	dibromochloromethane	1.00E-01	1.00E+00
carbazole	1.00E-01	1.00E+00	dichlorodifluoromethane	1.00E-01	1.00E+00
carbon disulfide	1.00E-01	1.00E+00	dieldrin	5.00E-02	1.00E+00
carbon tetrachloride	1.00E-01	1.00E+00	diethyl phthalate	1.00E-01	1.00E+00
chlordane	1.00E-01	1.00E+00	di-n-butylphthalate	1.00E-01	1.00E+00
chlorobenzene	1.00E-01	1.00E+00	di-n-octylphthalate	1.00E-01	1.00E+00
chloroform	1.00E-01	1.00E+00	endosulfan	5.00E-02	1.00E+00
chloromethane	1.00E-01	1.00E+00	endrin	5.00E-02	1.00E+00
chromium iii	1.00E-02	1.00E+00	ethyl chloride	1.00E-01	1.00E+00
chromium vi	1.00E-04	1.00E+00			
chrysene	1.50E-01	1.00E+00			

**Table B (cont.)**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Dermal Contact with Soils**

Compound	Non-Carcinogenic Calculation		
	CDI (mg/kg-d)	RfD (mg/kg-d)	UH (unitless)
bis(2-chloroethyl)ether	4.53E-07	NA	NA
bis(2-ethylhexyl)phthalate	4.53E-07	NA	NA
bromodichloromethane	4.53E-07	1.80E-02	2.52E-05
bromoform	4.53E-07	1.80E-02	2.52E-05
bromomethane	4.53E-07	NA	NA
cadmium	4.53E-09	2.50E-05	1.81E-04
carbazole	4.53E-07	NA	NA
carbon disulfide	4.53E-07	9.00E-02	5.03E-06
carbon tetrachloride	4.53E-07	NA	NA
chlordan	4.53E-07	5.40E-05	8.39E-03
chlorobenzene	4.53E-07	NA	NA
chloroform	4.53E-07	1.00E-02	4.53E-05
chloromethane	4.53E-07	NA	NA
chromium iii	4.53E-08	4.50E-01	1.01E-07
chromium vi	4.53E-10	9.00E-03	5.03E-08
chrysene	6.79E-07	NA	NA
cis-1,2-dichloroethene	4.53E-07	9.00E-02	5.03E-06
copper	4.53E-08	2.22E-02	2.04E-06
cumene	4.53E-07	3.60E-01	1.26E-06
cyanide	4.53E-08	1.44E-02	3.15E-06
dibenzo(a,h)anthracene	6.79E-07	NA	NA
dibromochloromethane	4.53E-07	1.80E-01	2.52E-06
dichlorodifluoromethane	4.53E-07	8.10E-01	5.59E-07
dieldrin	2.26E-07	4.50E-05	5.03E-03
diethyl phthalate	4.53E-07	7.20E+00	6.29E-08
di-n-butylphthalate	4.53E-07	9.00E-01	5.03E-07
di-n-octylphthalate	4.53E-07	1.80E-02	2.52E-05
endosulfan	2.26E-07	5.40E-03	4.19E-05
endrin	2.26E-07	2.70E-04	8.39E-04
ethyl chloride	4.53E-07	NA	NA

Compound	Carcinogenic Calculation		
	CDI (mg/kg-d)	CSF (mg/kg-d) <sup>-1</sup>	UR (unitless)
bis(2-chloroethyl)ether	5.32E-10	2.78E+00	1.48E-09
bis(2-ethylhexyl)phthalate	5.32E-10	9.33E-03	4.96E-12
bromodichloromethane	5.32E-10	1.44E-01	7.68E-11
bromoform	5.32E-10	8.81E-03	4.69E-12
bromomethane	5.32E-10	NA	NA
cadmium	5.32E-12	NA	NA
carbazole	5.32E-10	2.22E-02	1.18E-11
carbon disulfide	5.32E-10	NA	NA
carbon tetrachloride	5.32E-10	1.67E-01	8.86E-11
chlordan	5.32E-10	1.33E+00	7.09E-10
chlorobenzene	5.32E-10	NA	NA
chloroform	5.32E-10	3.10E-02	1.65E-11
chloromethane	5.32E-10	1.44E-02	7.68E-12
chromium iii	5.32E-11	NA	NA
chromium vi	5.32E-13	9.33E-01	4.96E-13
chrysene	7.98E-10	1.33E-01	1.06E-10
cis-1,2-dichloroethene	5.32E-10	NA	NA
copper	5.32E-11	NA	NA
cumene	5.32E-10	NA	NA
cyanide	5.32E-11	NA	NA
dibenzo(a,h)anthracene	7.98E-10	4.56E+00	3.63E-09
dibromochloromethane	5.32E-10	1.04E-01	5.55E-11
dichlorodifluoromethane	5.32E-10	NA	NA
dieldrin	2.66E-10	1.78E+01	4.73E-09
diethyl phthalate	5.32E-10	NA	NA
di-n-butylphthalate	5.32E-10	NA	NA
di-n-octylphthalate	5.32E-10	NA	NA
endosulfan	2.66E-10	NA	NA
endrin	2.66E-10	NA	NA
ethyl chloride	5.32E-10	NA	NA

**Table C**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Inhalation of Particulates and Volatiles**

$$\text{Intake Equation} = \frac{\text{CS} \times (\text{I}/\text{VF} + 1/\text{PEF}) \times \text{EF} \times \text{ED} \times \text{ET} \times \text{IR}}{\text{BW} \times \text{AT}}$$

IR	Inhalation rate of gases (RAGS, 1989)	2.5E+00 m <sup>3</sup> /h
EF	Exposure frequency	2.0E+01 days/year
EDn	Exposure duration for non-carcinogens	8.2E-02 year
EDc	Exposure duration for carcinogens	8.2E-02 year
BW	Body weight	7.0E+01 kg
ATc	Average time for carcinogens (lifetime)	2.6E+04 days
ATn	Average time for non-carcinogens (EDn x 365)	3.0E+01 days
ET	Exposure time	1.0E+00 h/d
CS	Concentration of chemicals in soil	(see table below)
VF	Volatilization Factor	(see table below)
PEF	Particulate Emission Factor	(see table below)

**Chemical Concentrations**

Compound	VF (m <sup>3</sup> /kg)	PEF (m <sup>3</sup> /kg)	Cs (mg/kg)	Compound	VF (m <sup>3</sup> /kg)	PEF (m <sup>3</sup> /kg)	Cs (mg/kg)
bis(2-chloroethyl)ether	7.8E+05	4.8E+09	1.0E+00	cis-1,2-dichloroethene	6.0E+04	4.8E+09	1.0E+00
bis(2-ethylhexyl)phthalate	1.0E+08	4.8E+09	1.0E+00	copper	NA	4.8E+09	1.0E+00
bromodichloromethane	3.6E+05	4.8E+09	1.0E+00	cumene	3.3E+05	4.8E+09	1.0E+00
bromoform	4.2E+05	4.8E+09	1.0E+00	cyanide	NA	4.8E+09	1.0E+00
bromomethane	1.8E+04	4.8E+09	1.0E+00	dibenz(a,h)anthracene	3.0E+10	4.8E+09	1.0E+00
cadmium	NA	4.8E+09	1.0E+00	dibromochloromethane	7.0E+04	4.8E+09	1.0E+00
carbazole	6.8E+07	4.8E+09	1.0E+00	dichlorodifluoromethane	4.4E+03	4.8E+09	1.0E+00
carbon disulfide	4.0E+04	4.8E+09	1.0E+00	dieldrin	1.1E+07	4.8E+09	1.0E+00
carbon tetrachloride	8.3E+04	4.8E+09	1.0E+00	diethyl phthalate	6.1E+06	4.8E+09	1.0E+00
chlordan	8.0E+06	4.8E+09	1.0E+00	di-n-butylphthalate	4.5E+06	4.8E+09	1.0E+00
chlorobenzene	1.5E+05	4.8E+09	1.0E+00	di-n-octylphthalate	6.6E+07	4.8E+09	1.0E+00
chloroform	7.9E+04	4.8E+09	1.0E+00	endosulfan	1.3E+07	4.8E+09	1.0E+00
chloromethane	1.0E+04	4.8E+09	1.0E+00	endrin	4.7E+07	4.8E+09	1.0E+00
chromium iii	NA	4.8E+09	1.0E+00	ethyl chloride	5.1E+04	4.8E+09	1.0E+00
chromium vi	NA	4.8E+09	1.0E+00				
chrysene	8.3E+08	4.8E+09	1.0E+00				

**Table C (cont.)**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Inhalation of Particulates and Volatiles**

Compound	Non-Carcinogenic Calculation			Compound	Carcinogenic Calculation		
	CDI (mg/kg-d)	RfD (mg/kg-d)	UH (unitless)		CDI (mg/kg-d)	CSF (mg/kg-d) <sub>-1</sub>	UR (unitless)
bis(2-chloroethyl)ether	2.5E-09	NA	NA	bis(2-chloroethyl)ether	3.0E-12	2.5E+00	7.4E-12
bis(2-ethylhexyl)phthalate	1.9E-11	NA	NA	bis(2-ethylhexyl)phthalate	2.3E-14	8.4E-03	1.9E-16
bromodichloromethane	5.3E-09	2.0E-02	2.7E-07	bromodichloromethane	6.3E-12	1.3E-01	8.2E-13
bromoform	4.7E-09	2.0E-02	2.3E-07	bromoform	5.5E-12	3.9E-03	2.1E-14
bromomethane	1.1E-07	NA	NA	bromomethane	1.3E-10	NA	NA
cadmium	4.1E-13	5.0E-04	8.2E-10	cadmium	4.8E-16	1.5E+01	7.2E-15
carbazole	2.9E-11	NA	NA	carbazole	3.4E-14	2.0E-02	6.8E-16
carbon disulfide	4.9E-08	2.0E-01	2.4E-07	carbon disulfide	5.7E-11	NA	NA
carbon tetrachloride	2.3E-08	NA	NA	carbon tetrachloride	2.8E-11	1.5E-01	4.1E-12
chlordan	2.4E-10	6.0E-05	4.1E-06	chlordan	2.9E-13	1.2E+00	3.4E-13
chlorobenzene	1.3E-08	NA	NA	chlorobenzene	1.5E-11	NA	NA
chloroform	2.5E-08	1.0E-02	2.5E-06	chloroform	2.9E-11	1.9E-02	5.5E-13
chloromethane	1.9E-07	NA	NA	chloromethane	2.2E-10	6.3E-03	1.4E-12
chromium iii	4.1E-13	1.0E+00	4.1E-13	chromium iii	4.8E-16	NA	NA
chromium vi	4.1E-13	2.0E-02	2.0E-11	chromium vi	4.8E-16	5.1E+02	2.4E-13
chrysene	2.8E-12	NA	NA	chrysene	3.2E-15	3.9E-02	1.3E-16
cis-1,2-dichloroethene	3.3E-08	1.0E-01	3.3E-07	cis-1,2-dichloroethene	3.8E-11	NA	NA
copper	4.1E-13	3.7E-02	1.1E-11	copper	4.8E-16	NA	NA
cumene	5.9E-09	2.6E-02	2.3E-07	cumene	7.0E-12	NA	NA
cyanide	4.1E-13	2.0E-02	2.0E-11	cyanide	4.8E-16	NA	NA
dibenzo(a,h)anthracene	4.7E-13	NA	NA	dibenzo(a,h)anthracene	5.6E-16	4.1E+00	2.3E-15
dibromochloromethane	2.8E-08	2.0E-01	1.4E-07	dibromochloromethane	3.3E-11	9.4E-02	3.1E-12
dichlorodifluoromethane	4.4E-07	5.7E-01	7.7E-07	dichlorodifluoromethane	5.2E-10	NA	NA
dieldrin	1.7E-10	5.0E-05	3.4E-06	dieldrin	2.0E-13	1.6E+01	3.2E-12
diethyl phthalate	3.2E-10	8.0E+00	4.0E-11	diethyl phthalate	3.8E-13	NA	NA
di-n-butylphthalate	4.3E-10	1.0E+00	4.3E-10	di-n-butylphthalate	5.1E-13	NA	NA
di-n-octylphthalate	3.0E-11	2.0E-02	1.5E-09	di-n-octylphthalate	3.5E-14	NA	NA
endosulfan	1.5E-10	6.0E-03	2.5E-08	endosulfan	1.7E-13	NA	NA
endrin	4.2E-11	3.0E-04	1.4E-07	endrin	4.9E-14	NA	NA
ethyl chloride	3.8E-08	2.9E+00	1.3E-08	ethyl chloride	4.5E-11	NA	NA

**Table D**  
**Summary of Unit Risk Calculations**  
**Construction Worker**

**Chemicals of Concern**

bis(2-chloroethyl)ether
bis(2-ethylhexyl)phthalate
bromodichloromethane
bromoform
bromomethane
cadmium
carbazole
carbon disulfide
carbon tetrachloride
chlordane
chlorobenzene
chloroform
chloromethane
chromium iii
chromium vi
chrysene
cis-1,2-dichloroethene
copper
cumene
cyanide
dibenzo(a,h)anthracene
dibromochloromethane
dichlorodifluoromethane
dieldrin
diethyl phthalate
di-n-butylphthalate
di-n-octylphthalate
endosulfan
endrin
ethyl chloride

Unit Hazard Quotient			
Soil			
Inhalation (unitless)	Dermal (unitless)	Ingestion (unitless)	Total (unitless)
NA	NA	NA	NA
NA	NA	NA	NA
2.67E-07	2.52E-05	1.87E-05	4.42E-05
2.34E-07	2.52E-05	1.87E-05	4.41E-05
NA	NA	NA	NA
8.18E-10	1.81E-04	7.50E-04	9.31E-04
NA	NA	NA	NA
2.43E-07	5.03E-06	3.75E-06	9.02E-06
NA	NA	NA	NA
4.05E-06	8.39E-03	6.25E-03	1.46E-02
NA	NA	NA	NA
2.48E-06	4.53E-05	3.75E-05	8.53E-05
NA	NA	NA	NA
4.09E-13	1.01E-07	3.75E-07	4.76E-07
2.04E-11	5.03E-08	1.87E-05	1.88E-05
NA	NA	NA	NA
3.28E-07	5.03E-06	3.75E-06	9.11E-06
1.11E-11	2.04E-06	1.01E-05	1.22E-05
2.30E-07	1.26E-06	9.37E-07	2.43E-06
2.04E-11	3.15E-06	1.87E-05	2.19E-05
NA	NA	NA	NA
1.39E-07	2.52E-06	1.87E-06	4.53E-06
7.71E-07	5.59E-07	4.17E-07	1.75E-06
3.44E-06	5.03E-03	7.50E-03	1.25E-02
4.03E-11	6.29E-08	4.69E-08	1.10E-07
4.32E-10	5.03E-07	3.75E-07	8.79E-07
1.50E-09	2.52E-05	1.87E-05	4.39E-05
2.47E-08	4.19E-05	6.25E-05	1.04E-04
1.39E-07	8.39E-04	1.25E-03	2.09E-03
1.35E-08	NA	NA	1.35E-08

Unit Incremental Lifetime Cancer Risk			
Soil			
Inhalation (unitless)	Dermal (unitless)	Ingestion (unitless)	Total (unitless)
7.39E-12	1.48E-09	1.10E-09	2.59E-09
1.92E-16	4.96E-12	3.70E-12	8.66E-12
8.17E-13	7.68E-11	5.72E-11	1.35E-10
2.15E-14	4.69E-12	3.49E-12	8.20E-12
NA	NA	NA	NA
7.20E-15	NA	NA	7.20E-15
6.83E-16	1.18E-11	8.80E-12	2.06E-11
NA	NA	NA	NA
4.14E-12	8.86E-11	6.60E-11	1.59E-10
3.43E-13	7.09E-10	5.28E-10	1.24E-09
NA	NA	NA	NA
5.53E-13	1.65E-11	1.36E-11	3.07E-11
1.39E-12	7.68E-12	5.72E-12	1.48E-11
NA	NA	NA	NA
2.45E-13	4.96E-13	1.85E-10	1.86E-10
1.27E-16	1.06E-10	5.28E-11	1.59E-10
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
2.28E-15	3.63E-09	1.80E-09	5.44E-09
3.08E-12	5.55E-11	4.14E-11	1.00E-10
NA	NA	NA	NA
3.23E-12	4.73E-09	7.04E-09	1.18E-08
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA

**Table E**  
**Summary of Health-Based Soil Concentrations**  
**Via Construction Worker Scenario**

**Chemicals of Concern**

bis(2-chloroethyl)ether
bis(2-ethylhexyl)phthalate
bromodichloromethane
bromoform
bromomethane
cadmium
carbazole
carbon disulfide
carbon tetrachloride
chlordane
chlorobenzene
chloroform
chloromethane
chromium iii
chromium vi
chrysene
cis-1,2-dichloroethene
copper
cumene
cyanide
dibenzo(a,h)anthracene
dibromochloromethane
dichlorodifluoromethane
dieldrin
diethyl phthalate
di-n-butylphthalate
di-n-octylphthalate
endosulfan
endrin
ethyl chloride

**Hazard Quotient**

Soil (mg/kg)		
Total Unit HQ (unitless)	Scaled Soil Concentration HQ=0.2	Risk based Concentration HQ=0.2
NA	NA	NA
NA	NA	NA
4.42E-05	4.53E+03	4.53E+03
4.41E-05	4.53E+03	4.53E+03
NA	NA	NA
9.31E-04	2.15E+02	2.15E+02
NA	NA	NA
9.02E-06	2.22E+04	2.22E+04
NA	NA	NA
1.46E-02	1.37E+01	1.37E+01
NA	NA	NA
8.53E-05	2.35E+03	2.35E+03
NA	NA	NA
4.76E-07	4.21E+05	4.21E+05
1.88E-05	1.06E+04	1.06E+04
NA	NA	NA
9.11E-06	2.20E+04	2.20E+04
1.22E-05	1.64E+04	1.64E+04
2.43E-06	8.24E+04	8.24E+04
2.19E-05	9.14E+03	9.14E+03
NA	NA	NA
4.53E-06	4.41E+04	4.41E+04
1.75E-06	1.14E+05	1.14E+05
1.25E-02	1.60E+01	1.60E+01
1.10E-07	1.82E+06	1.82E+06
8.79E-07	2.28E+05	2.28E+05
4.39E-05	4.55E+03	4.55E+03
1.04E-04	1.91E+03	1.91E+03
2.09E-03	9.58E+01	9.58E+01
1.35E-08	1.49E+07	1.49E+07

**Incremental Lifetime Cancer Risk**

Soil (mg/kg)		
Total Unit ILCR (unitless)	Scaled Soil Concentration ILCR=1E-06	Risk based Concentration ILCR=1E-06
2.59E-09	3.87E+02	3.87E+02
8.66E-12	1.15E+05	1.15E+05
1.35E-10	7.42E+03	7.42E+03
8.20E-12	1.22E+05	1.22E+05
NA	NA	NA
7.20E-15	1.39E+08	1.39E+08
2.06E-11	4.85E+04	4.85E+04
NA	NA	NA
1.59E-10	6.30E+03	6.30E+03
1.24E-09	8.08E+02	8.08E+02
NA	NA	NA
3.07E-11	3.26E+04	3.26E+04
1.48E-11	6.76E+04	6.76E+04
NA	NA	NA
1.86E-10	5.39E+03	5.39E+03
1.59E-10	6.28E+03	6.28E+03
NA	NA	NA
5.44E-09	1.84E+02	1.84E+02
1.00E-10	1.00E+04	1.00E+04
NA	NA	NA
1.18E-08	8.49E+01	8.49E+01
NA	NA	NA

**Table A**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Incidental Ingestion of Soils**

$$\text{Intake Equation} = \frac{\text{CS} \times \text{EF} \times \text{ED}_{\text{n}} \times \text{CF} \times \text{IR}}{\text{BW} \times \text{AT}}$$

IRs	Ingestion rate of soil (RAGS, 1989)	480 mg/day
CF	Conversion factor	1.0E-06 kg/mg
EF	Exposure frequency	20 d/year
ED <sub>n</sub>	Exposure duration for non-carcinogens	0.082 year
ED <sub>c</sub>	Exposure duration for carcinogens	0.082 year
BW	Body weight	70 kg
AT <sub>c</sub>	Average time for carcinogens (lifetime)	25550 day
AT <sub>n</sub>	Average time for non-carcinogens (ED <sub>n</sub> x 365)	30 day
CS	Concentration of chemicals in soil (see table below)	

**Chemical Concentrations**

Compound	Concentration	Compound	Concentration
ethylbenzene	1.0E+00	methylene bromide	1.0E+00
fluoranthene	1.0E+00	methylene chloride	1.0E+00
fluorene	1.0E+00	methyl-tert-butyl ether	1.0E+00
gamma-bhc	1.0E+00	molybdenum	1.0E+00
heptachlor	1.0E+00	n-butylbenzyl phthalate	1.0E+00
heptachlor epoxide	1.0E+00	nickel	1.0E+00
hexachlorobenzene	1.0E+00	nitroaniline, o-	1.0E+00
hexachlorobutadiene	1.0E+00	nitrobenzene	1.0E+00
hexachlorocyclopentadiene	1.0E+00	nitrosodiphenylamine, p-	1.0E+00
hexachloroethane	1.0E+00	n-nitrosodimethylamine	1.0E+00
indeno(1,2,3-cd)pyrene	1.0E+00	n-nitroso-di-n-propylamine	1.0E+00
isobutyl alcohol	1.0E+00	n-nitrosodiphenylamine	1.0E+00
isophorone	1.0E+00	o-chlorotoluene	1.0E+00
mercury	1.0E+00	p-chloro-m-cresol	1.0E+00
methoxychlor	1.0E+00		
methyl methacrylate	1.0E+00		

**Table A (cont.)**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Incidental Ingestion of Soils**

Non-Carcinogenic Calculation			
Compound	CDI (mg/kg-d)	RfD (mg/kg-d)	UH (unitless)
ethylbenzene	3.75E-07	NA	NA
fluoranthene	3.75E-07	4.00E-01	9.37E-07
fluorene	3.75E-07	4.00E-01	9.37E-07
gamma-bhc	3.75E-07	3.00E-03	1.25E-04
heptachlor	3.75E-07	5.00E-04	7.50E-04
heptachlor epoxide	3.75E-07	1.30E-05	2.88E-02
hexachlorobenzene	3.75E-07	NA	NA
hexachlorobutadiene	3.75E-07	NA	NA
hexachlorocyclopentadiene	3.75E-07	7.00E-02	5.36E-06
hexachloroethane	3.75E-07	1.00E-02	3.75E-05
indeno(1,2,3-cd)pyrene	3.75E-07	NA	NA
isobutyl alcohol	3.75E-07	3.00E+00	1.25E-07
isophorone	3.75E-07	2.00E+00	1.87E-07
mercury	3.75E-07	3.00E-04	1.25E-03
methoxychlor	3.75E-07	5.00E-03	7.50E-05
methyl methacrylate	3.75E-07	8.00E-02	4.69E-06
methylene bromide	3.75E-07	1.00E-01	3.75E-06
methylene chloride	3.75E-07	6.00E-02	6.25E-06
methyl-tert-butyl ether	3.75E-07	NA	NA
molybdenum	3.75E-07	4.00E-02	9.37E-06
n-butylbenzyl phthalate	3.75E-07	2.00E-01	1.87E-06
nickel	3.75E-07	2.00E-02	1.87E-05
nitroaniline, o-	3.75E-07	NA	NA
nitrobenzene	3.75E-07	5.00E-03	7.50E-05
nitrosodiphenylamine, p-	3.75E-07	NA	NA
n-nitrosodimethylamine	3.75E-07	NA	NA
n-nitroso-di-n-propylamine	3.75E-07	NA	NA
n-nitrosodiphenylamine	3.75E-07	NA	NA
o-chlorotoluene	3.75E-07	2.00E-01	1.87E-06
p-chloro-m-cresol	3.75E-07	2.00E+00	1.87E-07

Carcinogenic Calculation			
Compound	CDI (mg/kg-d)	CSF (mg/kg-d)-1	UR (unitless)
ethylbenzene	4.40E-10	NA	NA
fluoranthene	4.40E-10	NA	NA
fluorene	4.40E-10	NA	NA
gamma-bhc	4.40E-10	1.10E+00	4.84E-10
heptachlor	4.40E-10	5.70E+00	2.51E-09
heptachlor epoxide	4.40E-10	1.30E+01	5.72E-09
hexachlorobenzene	4.40E-10	1.80E+00	7.92E-10
hexachlorobutadiene	4.40E-10	7.80E-02	3.43E-11
hexachlorocyclopentadiene	4.40E-10	NA	NA
hexachloroethane	4.40E-10	3.90E-02	1.72E-11
indeno(1,2,3-cd)pyrene	4.40E-10	1.20E+00	5.28E-10
isobutyl alcohol	4.40E-10	NA	NA
isophorone	4.40E-10	9.50E-04	4.18E-13
mercury	4.40E-10	NA	NA
methoxychlor	4.40E-10	NA	NA
methyl methacrylate	4.40E-10	NA	NA
methylene bromide	4.40E-10	NA	NA
methylene chloride	4.40E-10	1.40E-02	6.16E-12
methyl-tert-butyl ether	4.40E-10	NA	NA
molybdenum	4.40E-10	NA	NA
n-butylbenzyl phthalate	4.40E-10	NA	NA
nickel	4.40E-10	NA	NA
nitroaniline, o-	4.40E-10	NA	NA
nitrobenzene	4.40E-10	NA	NA
nitrosodiphenylamine, p-	4.40E-10	2.20E-02	9.68E-12
n-nitrosodimethylamine	4.40E-10	1.60E+01	7.04E-09
n-nitroso-di-n-propylamine	4.40E-10	7.00E+00	3.08E-09
n-nitrosodiphenylamine	4.40E-10	9.00E-03	3.96E-12
o-chlorotoluene	4.40E-10	NA	NA
p-chloro-m-cresol	4.40E-10	NA	NA

**Table B**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Dermal Contact with Soils**

$$\text{Intake Equation} = \frac{\text{CS} \times \text{CF} \times \text{EF} \times \text{ED} \times \text{AF} \times \text{ABS} \times \text{SA}}{\text{BW} \times \text{AT}}$$

SA	Surface area of exposed skin (50th percentile, hands only)	5800 cm <sup>2</sup> /day
AF	Adherence Factor	1 mg/cm <sup>2</sup>
ABS	Absorption factor (see table below)	csv
CF	Conversion factor	1.0E-06 kg/mg
EF	Exposure frequency	20 d/year
EDn	Exposure duration for non-carcinogens	0 year
EDc	Exposure duration for carcinogens	0 year
BW	Body weight	70 kg
ATc	Average time for carcinogens (lifetime)	25550 day
ATn	Average time for non-carcinogens (EDn x 365)	30 day
CS	Concentration of chemicals in soil (see table below)	csv

#### Chemical Concentrations

Compound	ABS (unitless)	Concentration (mg/kg)	Compound	ABS (unitless)	Concentration (mg/kg)
ethylbenzene	1.00E-01	1.00E+00	methylene bromide	1.00E-01	1.00E+00
fluoranthene	1.00E-01	1.00E+00	methylene chloride	1.00E-01	1.00E+00
fluorene	1.00E-01	1.00E+00	methyl-tert-butyl ether	1.00E-01	1.00E+00
gamma-bhc	5.00E-02	1.00E+00	molybdenum	1.00E-02	1.00E+00
heptachlor	5.00E-02	1.00E+00	n-butylbenzyl phthalate	1.00E-01	1.00E+00
heptachlor epoxide	5.00E-02	1.00E+00	1.00E-02	1.00E+00	
hexachlorobenzene	1.00E-01	1.00E+00	nitroaniline, o-	1.00E-01	1.00E+00
hexachlorobutadiene	1.00E-01	1.00E+00	nitrobenzene	1.00E-01	1.00E+00
hexachlorocyclopentadiene	1.00E-01	1.00E+00	nitrosodiphenylamine, p-	1.00E-01	1.00E+00
hexachloroethane	1.00E-01	1.00E+00	n-nitrosodimethylamine	1.00E-01	1.00E+00
indeno(1,2,3-cd)pyrene	1.00E-01	1.00E+00	n-nitroso-di-n-propylamine	1.00E-01	1.00E+00
isobutyl alcohol	1.00E-01	1.00E+00	n-nitrosodiphenylamine	1.00E-01	1.00E+00
isophorone	1.00E-01	1.00E+00	o-chlorotoluene	1.00E-01	1.00E+00
mercury	1.00E-02	1.00E+00	p-chloro-m-cresol	1.00E-01	1.00E+00
methoxychlor	1.00E-01	1.00E+00			
methyl methacrylate	1.00E-01	1.00E+00			

**Table B (cont.)**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Dermal Contact with Soils**

Non-Carcinogenic Calculation			
Compound	CDI (mg/kg-d)	RfD (mg/kg-d)	UH (unitless)
ethylbenzene	4.53E-07	NA	NA
fluoranthene	4.53E-07	3.60E-01	1.26E-06
fluorene	4.53E-07	3.60E-01	1.26E-06
gamma-bhc	2.26E-07	2.94E-03	7.70E-05
heptachlor	2.26E-07	2.00E-04	1.13E-03
heptachlor epoxide	2.26E-07	1.17E-05	1.94E-02
hexachlorobenzene	4.53E-07	NA	NA
hexachlorobutadiene	4.53E-07	NA	NA
hexachlorocyclopentadiene	4.53E-07	6.30E-02	7.19E-06
hexachloroethane	4.53E-07	9.00E-03	5.03E-05
indeno(1,2,3-cd)pyrene	4.53E-07	NA	NA
isobutyl alcohol	4.53E-07	2.70E+00	1.68E-07
isophorone	4.53E-07	1.80E+00	2.52E-07
mercury	4.53E-08	4.50E-05	1.01E-03
methoxychlor	4.53E-07	4.50E-03	1.01E-04
methyl methacrylate	4.53E-07	7.20E-02	6.29E-06
methylene bromide	4.53E-07	9.00E-02	5.03E-06
methylene chloride	4.53E-07	6.00E-02	7.55E-06
methyl-tert-butyl ether	4.53E-07	NA	NA
molybdenum	4.53E-08	1.52E-02	2.98E-06
n-butylbenzyl phthalate	4.53E-07	1.80E-01	2.52E-06
nickel	4.53E-08	1.00E-03	4.53E-05
nitroaniline, o-	4.53E-07	NA	NA
nitrobenzene	4.53E-07	4.50E-03	1.01E-04
nitrosodiphenylamine, p-	4.53E-07	NA	NA
n-nitrosodimethylamine	4.53E-07	NA	NA
n-nitroso-di-n-propylamine	4.53E-07	NA	NA
n-nitrosodiphenylamine	4.53E-07	NA	NA
o-chlorotoluene	4.53E-07	1.80E-01	2.52E-06
p-chloro-m-cresol	4.53E-07	1.80E+00	2.52E-07

Carcinogenic Calculation			
Compound	CDI (mg/kg-d)	CSF (mg/kg-d) <sub>-1</sub>	UR (unitless)
ethylbenzene	5.32E-10	NA	NA
fluoranthene	5.32E-10	NA	NA
fluorene	5.32E-10	NA	NA
gamma-bhc	2.66E-10	1.12E+00	2.98E-10
heptachlor	2.66E-10	1.43E+01	3.79E-09
heptachlor epoxide	2.66E-10	1.44E+01	3.84E-09
hexachlorobenzene	5.32E-10	2.00E+00	1.06E-09
hexachlorobutadiene	5.32E-10	8.67E-02	4.61E-11
hexachlorocyclopentadiene	5.32E-10	NA	NA
hexachloroethane	5.32E-10	4.33E-02	2.30E-11
indeno(1,2,3-cd)pyrene	5.32E-10	1.33E+00	7.09E-10
isobutyl alcohol	5.32E-10	NA	NA
isophorone	5.32E-10	1.06E-03	5.61E-13
mercury	5.32E-11	NA	NA
methoxychlor	5.32E-10	NA	NA
methyl methacrylate	5.32E-10	NA	NA
methylene bromide	5.32E-10	NA	NA
methylene chloride	5.32E-10	1.40E-02	7.45E-12
methyl-tert-butyl ether	5.32E-10	NA	NA
molybdenum	5.32E-11	NA	NA
n-butylbenzyl phthalate	5.32E-10	NA	NA
nickel	5.32E-11	NA	NA
nitroaniline, o-	5.32E-10	NA	NA
nitrobenzene	5.32E-10	NA	NA
nitrosodiphenylamine, p-	5.32E-10	2.44E-02	1.30E-11
n-nitrosodimethylamine	5.32E-10	1.78E+01	9.45E-09
n-nitroso-di-n-propylamine	5.32E-10	7.78E+00	4.14E-09
n-nitrosodiphenylamine	5.32E-10	1.00E-02	5.32E-12
o-chlorotoluene	5.32E-10	NA	NA
p-chloro-m-cresol	5.32E-10	NA	NA

**Table C**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Inhalation of Particulates and Volatiles**

$$\text{Intake Equation} = \frac{\text{CS} \times (\text{I}/\text{VF} + 1/\text{PEF}) \times \text{EF} \times \text{ED} \times \text{ET} \times \text{IR}}{\text{BW} \times \text{AT}}$$

IR	Inhalation rate of gases (RAGS, 1989)	2.5E+00 m³/h
EF	Exposure frequency	2.0E+01 days/year
EDn	Exposure duration for non-carcinogens	8.2E-02 year
EDc	Exposure duration for carcinogens	8.2E-02 year
BW	Body weight	7.0E+01 kg
ATc	Average time for carcinogens (lifetime)	2.6E+04 days
ATn	Average time for non-carcinogens (EDn x 365)	3.0E+01 days
ET	Exposure time	1.0E+00 h/d
CS	Concentration of chemicals in soil	(see table below)
VF	Volatilization Factor	(see table below)
PEF	Particulate Emission Factor	(see table below)

**Chemical Concentrations**

Compound	VF (m³/kg)	PEF (m³/kg)	Cs (mg/kg)	Compound	VF (m³/kg)	PEF (m³/kg)	Cs (mg/kg)
ethylbenzene	1.1E+05	4.8E+09	1.0E+00	methylene bromide	1.2E+05	4.8E+09	1.0E+00
fluoranthene	6.1E+07	4.8E+09	1.0E+00	methylene chloride	3.8E+04	4.8E+09	1.0E+00
fluorene	4.1E+06	4.8E+09	1.0E+00	methyl-tert-butyl ether	8.8E+04	4.8E+09	1.0E+00
gamma-bhc	1.0E+07	4.8E+09	1.0E+00	molybdenum	NA	4.8E+09	1.0E+00
heptachlor	1.9E+06	4.8E+09	1.0E+00	n-butylbenzyl phthalate	1.3E+07	4.8E+09	1.0E+00
heptachlor epoxide	2.5E+06	4.8E+09	1.0E+00	nickel	NA	4.8E+09	1.0E+00
hexachlorobenzene	1.3E+06	4.8E+09	1.0E+00	nitroaniline, o-	1.4E+07	4.8E+09	1.0E+00
hexachlorobutadiene	1.4E+06	4.8E+09	1.0E+00	nitrobenzene	1.2E+06	4.8E+09	1.0E+00
hexachlorocyclopentadiene	4.9E+05	4.8E+09	1.0E+00	nitrosodiphenylamine, p-	8.9E+06	4.8E+09	1.0E+00
hexachloroethane	1.8E+06	4.8E+09	1.0E+00	n-nitrosodimethylamine	5.5E+03	4.8E+09	1.0E+00
indeno(1,2,3-cd)pyrene	4.1E+09	4.8E+09	1.0E+00	n-nitroso-di-n-propylamine	1.0E+06	4.8E+09	1.0E+00
isobutyl alcohol	2.0E+05	4.8E+09	1.0E+00	n-nitrosodiphenylamine	1.2E+08	4.8E+09	1.0E+00
isophorone	3.1E+06	4.8E+09	1.0E+00	o-chlorotoluene	1.6E+05	4.8E+09	1.0E+00
mercury	NA	4.8E+09	1.0E+00	p-chloro-m-cresol	6.2E+06	4.8E+09	1.0E+00
methoxychlor	3.8E+07	4.8E+09	1.0E+00				
methyl methacrylate	5.7E+04	4.8E+09	1.0E+00				

**Table C (cont.)**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Inhalation of Particulates and Volatiles**

Compound	Non-Carcinogenic Calculation		
	CDI (mg/kg-d)	RfD (mg/kg-d)	UH (unitless)
ethylbenzene	1.8E-08	NA	NA
fluoranthene	3.3E-11	4.0E-01	8.1E-11
fluorene	4.7E-10	4.0E-01	1.2E-09
gamma-bhc	1.9E-10	3.0E-03	6.5E-08
heptachlor	1.0E-09	5.0E-04	2.1E-06
heptachlor epoxide	7.9E-10	1.3E-05	6.1E-05
hexachlorobenzene	1.5E-09	NA	NA
hexachlorobutadiene	1.4E-09	NA	NA
hexachlorocyclopentadiene	4.0E-09	2.0E-04	2.0E-05
hexachloroethane	1.1E-09	1.0E-02	1.1E-07
indeno(1,2,3-cd)pyrene	8.9E-13	NA	NA
isobutyl alcohol	9.6E-09	3.0E+00	3.2E-09
isophorone	6.3E-10	2.0E+00	3.1E-10
mercury	4.1E-13	8.6E-05	4.8E-09
methoxychlor	5.2E-11	5.0E-03	1.0E-08
methyl methacrylate	3.4E-08	8.0E-02	4.3E-07
methylene bromide	1.7E-08	1.0E-01	1.7E-07
methylene chloride	5.2E-08	8.6E-01	6.1E-08
methyl-tert-butyl ether	2.2E-08	NA	NA
molybdenum	4.1E-13	4.0E-02	1.0E-11
n-butylbenzyl phthalate	1.6E-10	2.0E-01	7.8E-10
nickel	4.1E-13	2.0E-02	2.0E-11
nitroaniline, o-	1.4E-10	5.7E-04	2.4E-07
nitrobenzene	1.6E-09	5.7E-03	2.8E-07
nitrosodiphenylamine, p-	2.2E-10	NA	NA
n-nitrosodimethylamine	3.6E-07	NA	NA
n-nitroso-di-n-propylamine	1.9E-09	NA	NA
n-nitrosodiphenylamine	1.6E-11	NA	NA
o-chlorotoluene	1.2E-08	2.0E-01	6.1E-08
p-chloro-m-cresol	3.2E-10	2.0E+00	1.6E-10

Compound	Carcinogenic Calculation		
	CDI (mg/kg-d)	CSF (mg/kg-d)-1	UR (unitless)
ethylbenzene	2.1E-11	NA	NA
fluoranthene	3.8E-14	NA	NA
fluorene	5.6E-13	NA	NA
gamma-bhc	2.3E-13	1.1E+00	2.5E-13
heptachlor	1.2E-12	5.7E+00	7.0E-12
heptachlor epoxide	9.3E-13	1.3E+01	1.2E-11
hexachlorobenzene	1.7E-12	1.8E+00	3.1E-12
hexachlorobutadiene	1.6E-12	7.8E-02	1.3E-13
hexachlorocyclopentadiene	4.7E-12	NA	NA
hexachloroethane	1.3E-12	3.9E-02	5.0E-14
indeno(1,2,3-cd)pyrene	1.0E-15	3.9E-01	4.1E-16
isobutyl alcohol	1.1E-11	NA	NA
isophorone	7.4E-13	9.5E-04	7.0E-16
mercury	4.8E-16	NA	NA
methoxychlor	6.1E-14	NA	NA
methyl methacrylate	4.0E-11	NA	NA
methylene bromide	2.0E-11	NA	NA
methylene chloride	6.1E-11	3.5E-03	2.1E-13
methyl-tert-butyl ether	2.6E-11	NA	NA
molybdenum	4.8E-16	NA	NA
n-butylbenzyl phthalate	1.8E-13	NA	NA
nickel	4.8E-16	9.1E-01	4.4E-16
nitroaniline, o-	1.6E-13	NA	NA
nitrobenzene	1.9E-12	NA	NA
nitrosodiphenylamine, p-	2.6E-13	2.2E-02	5.7E-15
n-nitrosodimethylamine	4.2E-10	1.6E+01	6.7E-09
n-nitroso-di-n-propylamine	2.2E-12	7.0E+00	1.5E-11
n-nitrosodiphenylamine	1.9E-14	9.0E-03	1.7E-16
o-chlorotoluene	1.4E-11	NA	NA
p-chloro-m-cresol	3.7E-13	NA	NA

**Table D**  
**Summary of Unit Risk Calculations**  
**Construction Worker**

**Chemicals of Concern**

ethylbenzene
fluoranthene
fluorene
gamma-bhc
heptachlor
heptachlor epoxide
hexachlorobenzene
hexachlorobutadiene
hexachlorocyclopentadiene
hexachloroethane
indeno(1,2,3-cd)pyrene
isobutyl alcohol
isophorone
mercury
methoxychlor
methyl methacrylate
methylene bromide
methylene chloride
methyl-tert-butyl ether
molybdenum
n-butylbenzyl phthalate
nickel
nitroaniline, o-
nitrobenzene
nitrosodiphenylamine, p-
n-nitrosodimethylamine
n-nitroso-di-n-propylamine
n-nitrosodiphenylamine
o-chlorotoluene
p-chloro-m-cresol

Unit Hazard Quotient			
Soil			
Inhalation (unitless)	Dermal (unitless)	Ingestion (unitless)	Total (unitless)
NA	NA	NA	NA
8.13E-11	1.26E-06	9.37E-07	2.20E-06
1.18E-09	1.26E-06	9.37E-07	2.20E-06
6.49E-08	7.70E-05	1.25E-04	2.02E-04
2.08E-06	1.13E-03	7.50E-04	1.88E-03
6.08E-05	1.94E-02	2.88E-02	4.83E-02
NA	NA	NA	NA
NA	NA	NA	NA
2.00E-05	7.19E-06	5.36E-06	3.25E-05
1.08E-07	5.03E-05	3.75E-05	8.79E-05
NA	NA	NA	NA
3.20E-09	1.68E-07	1.25E-07	2.96E-07
3.14E-10	2.52E-07	1.87E-07	4.39E-07
4.77E-09	1.01E-03	1.25E-03	2.26E-03
1.04E-08	1.01E-04	7.50E-05	1.76E-04
4.26E-07	6.29E-06	4.69E-06	1.14E-05
1.69E-07	5.03E-06	3.75E-06	8.95E-06
6.05E-08	7.55E-06	6.25E-06	1.39E-05
NA	NA	NA	NA
1.02E-11	2.98E-06	9.37E-06	1.24E-05
7.76E-10	2.52E-06	1.87E-06	4.39E-06
2.04E-11	4.53E-05	1.87E-05	6.40E-05
2.37E-07	NA	NA	2.37E-07
2.77E-07	1.01E-04	7.50E-05	1.76E-04
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
6.11E-08	2.52E-06	1.87E-06	4.45E-06
1.59E-10	2.52E-07	1.87E-07	4.39E-07

Unit Incremental Lifetime Cancer Risk			
Soil			
Inhalation (unitless)	Dermal (unitless)	Ingestion (unitless)	Total (unitless)
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
2.52E-13	2.98E-10	4.84E-10	7.83E-10
6.95E-12	3.79E-09	2.51E-09	6.31E-09
1.21E-11	3.84E-09	5.72E-09	9.58E-09
3.11E-12	1.06E-09	7.92E-10	1.86E-09
1.28E-13	4.61E-11	3.43E-11	8.06E-11
NA	NA	NA	NA
4.97E-14	2.30E-11	1.72E-11	4.03E-11
4.06E-16	7.09E-10	5.28E-10	1.24E-09
NA	NA	NA	NA
7.01E-16	5.61E-13	4.18E-13	9.80E-13
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
2.13E-13	7.45E-12	6.16E-12	1.38E-11
NA	NA	NA	NA
NA	NA	NA	NA
NA	NA	NA	NA
4.37E-16	NA	NA	4.37E-16
NA	NA	NA	NA
NA	NA	NA	NA
5.69E-15	1.30E-11	9.68E-12	2.27E-11
6.70E-09	9.45E-09	7.04E-09	2.32E-08
1.54E-11	4.14E-09	3.08E-09	7.23E-09
1.73E-16	5.32E-12	3.96E-12	9.28E-12
NA	NA	NA	NA
NA	NA	NA	NA

**Table E**  
**Summary of Health-Based Soil Concentrations**  
**Via Construction Worker Scenario**

**Chemicals of Concern**

Chemical Name
ethylbenzene
fluoranthene
fluorene
gamma-bhc
heptachlor
heptachlor epoxide
hexachlorobenzene
hexachlorobutadiene
hexachlorocyclopentadiene
hexachloroethane
indeno(1,2,3-cd)pyrene
isobutyl alcohol
isophorone
mercury
methoxychlor
methyl methacrylate
methylene bromide
methylene chloride
methyl-tert-butyl ether
molybdenum
n-butylbenzyl phthalate
nickel
nitroaniline, o-
nitrobenzene
nitrosodiphenylamine, p-
n-nitrosodimethylamine
n-nitroso-di-n-propylamine
n-nitrosodiphenylamine
o-chlorotoluene
p-chloro-m-cresol

**Hazard Quotient**

Soil (mg/kg)		
Total Unit HQ (unitless)	Scaled Soil Concentration HQ=0.2	Risk based Concentration HQ=0.2
NA	NA	NA
2.20E-06	9.11E+04	9.11E+04
2.20E-06	9.11E+04	9.11E+04
2.02E-04	9.90E+02	9.90E+02
1.88E-03	1.06E+02	1.06E+02
4.83E-02	4.14E+00	4.14E+00
NA	NA	NA
NA	NA	NA
3.25E-05	6.15E+03	6.15E+03
8.79E-05	2.27E+03	2.27E+03
NA	NA	NA
2.96E-07	6.76E+05	6.76E+05
4.39E-07	4.55E+05	4.55E+05
2.26E-03	8.86E+01	8.86E+01
1.76E-04	1.14E+03	1.14E+03
1.14E-05	1.75E+04	1.75E+04
8.95E-06	2.23E+04	2.23E+04
1.39E-05	1.44E+04	1.44E+04
NA	NA	NA
1.24E-05	1.62E+04	1.62E+04
4.39E-06	4.55E+04	4.55E+04
6.40E-05	3.12E+03	3.12E+03
2.37E-07	8.43E+05	8.43E+05
1.76E-04	1.14E+03	1.14E+03
NA	NA	NA
4.45E-06	4.49E+04	4.49E+04
4.39E-07	4.55E+05	4.55E+05

**Incremental Lifetime Cancer Risk**

Soil (mg/kg)		
Total Unit ILCR (unitless)	Scaled Soil Concentration ILCR=1E-06	Risk based Concentration ILCR=1E-06
NA	NA	NA
NA	NA	NA
NA	NA	NA
7.83E-10	1.28E+03	1.28E+03
6.31E-09	1.59E+02	1.59E+02
9.58E-09	1.04E+02	1.04E+02
1.86E-09	5.38E+02	5.38E+02
8.06E-11	1.24E+04	1.24E+04
NA	NA	NA
4.03E-11	2.48E+04	2.48E+04
1.24E-09	8.08E+02	8.08E+02
NA	NA	NA
9.80E-13	1.02E+06	1.02E+06
NA	NA	NA
1.38E-11	7.24E+04	7.24E+04
NA	NA	NA
NA	NA	NA
NA	NA	NA
4.37E-16	2.29E+09	2.29E+09
NA	NA	NA
NA	NA	NA
2.27E-11	4.41E+04	4.41E+04
2.32E-08	4.31E+01	4.31E+01
7.23E-09	1.38E+02	1.38E+02
9.28E-12	1.08E+05	1.08E+05
NA	NA	NA
NA	NA	NA

**Table A**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Incidental Ingestion of Soils**

$$\text{Intake Equation} = \frac{\text{CS} \times \text{EF} \times \text{ED} \times \text{CF} \times \text{JR}}{\text{BW} \times \text{AT}}$$

IRs	Ingestion rate of soil (RAGS, 1989)	480 mg/day
CF	Conversion factor	1.0E-06 kg/mg
EF	Exposure frequency	20 d/year
EDn	Exposure duration for non-carcinogens	0.082 year
EDc	Exposure duration for carcinogens	0.082 year
BW	Body weight	70 kg
ATc	Average time for carcinogens (lifetime)	25550 day
ATn	Average time for non-carcinogens (EDn x 365)	30 day
CS	Concentration of chemicals in soil (see table below)	

**Chemical Concentrations**

Compound	Concentration	Compound	Concentration
pentachlorophenol	1.0E+00		
phenol	1.0E+00		
pyrene	1.0E+00		
selenium	1.0E+00		
silver	1.0E+00		
styrene	1.0E+00		
tetrachloroethene	1.0E+00		
toluene	1.0E+00		
toxaphene	1.0E+00		
trans-1,2-dichloroethene	1.0E+00		
trichloroethene	1.0E+00		
trichlorofluoromethane	1.0E+00		
vanadium	1.0E+00		
vinyl acetate	1.0E+00		
vinyl chloride	1.0E+00		
xylenes	1.0E+00		
		zinc	1.0E+00

**Table A (cont.)**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Incidental Ingestion of Soils**

**Table B**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Dermal Contact with Soils**

**Intake Equation** = CS X CF X EF X ED X AF X ABS X SA  
BW X AT

SA	Surface area of exposed skin (50th percentile, hands only)	5800 cm <sup>2</sup> /day
AF	Adherence Factor	1 mg/cm <sup>2</sup>
ABS	Absorption factor (see table below)	csv
CF	Conversion factor	1.0E-06 kg/mg
EF	Exposure frequency	20 d/year
EDn	Exposure duration for non-carcinogens	0 year
EDc	Exposure duration for carcinogens	0 year
BW	Body weight	70 kg
ATc	Average time for carcinogens (lifetime)	25550 day
ATn	Average time for non-carcinogens (EDn x 365)	30 day
CS	Concentration of chemicals in soil (see table below)	csv

**Chemical Concentrations**

Compound	ABS (unitless)	Concentration (mg/kg)	Compound	ABS (unitless)	Concentration (mg/kg)
pentachlorophenol	2.50E-01	1.00E+00	zinc	1.00E-02	1.00E+00
phenol	1.00E-01	1.00E+00	NA	NA	NA
pyrene	1.50E-01	1.00E+00	NA	NA	NA
selenium	1.00E-02	1.00E+00	NA	NA	NA
silver	1.00E-02	1.00E+00	NA	NA	NA
styrene	1.00E-01	1.00E+00	NA	NA	NA
tetrachloroethene	1.00E-01	1.00E+00	NA	NA	NA
toluene	1.00E-01	1.00E+00	NA	NA	NA
toxaphene	1.00E-01	1.00E+00	NA	NA	NA
trans-1,2-dichloroethene	1.00E-01	1.00E+00	NA	NA	NA
trichloroethene	1.00E-01	1.00E+00	NA	NA	NA
trichlorofluoromethane	1.00E-01	1.00E+00	NA	NA	NA
vanadium	1.00E-02	1.00E+00	NA	NA	NA
vinyl acetate	1.00E-01	1.00E+00	NA	NA	NA
vinyl chloride	1.00E-01	1.00E+00	NA	NA	NA
xylenes	1.00E-01	1.00E+00	NA	NA	NA

**Table B (cont.)**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Dermal Contact with Soils**

**Table C**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Inhalation of Particulates and Volatiles**

$$\text{Intake Equation} = \frac{\text{CS} \times (\text{I}/\text{VF} + 1/\text{PEF}) \times \text{EF} \times \text{ED} \times \text{ET} \times \text{JR}}{\text{BW} \times \text{AT}}$$

IR	Inhalation rate of gases (RAGS, 1989)	2.5E+00 m³/h
EF	Exposure frequency	2.0E+01 days/year
EDn	Exposure duration for non-carcinogens	8.2E-02 year
EDc	Exposure duration for carcinogens	8.2E-02 year
BW	Body weight	7.0E+01 kg
ATc	Average time for carcinogens (lifetime)	2.6E+04 days
ATn	Average time for non-carcinogens (EDn x 365)	3.0E+01 days
ET	Exposure time	1.0E+00 h/d
CS	Concentration of chemicals in soil	(see table below)
VF	Volatilization Factor	(see table below)
PEF	Particulate Emission Factor	(see table below)

**Chemical Concentrations**

Compound	VF (m³/kg)	PEF (m³/kg)	Cs (mg/kg)	Compound	VF (m³/kg)	PEF (m³/kg)	Cs (mg/kg)
pentachlorophenol	1.4E+07	4.8E+09	1.0E+00	zinc	NA	4.8E+09	1.0E+00
phenol	5.1E+06	4.8E+09	1.0E+00	NA	NA	NA	NA
pyrene	8.2E+07	4.8E+09	1.0E+00	NA	NA	NA	NA
selenium	NA	4.8E+09	1.0E+00	NA	NA	NA	NA
silver	NA	4.8E+09	1.0E+00	NA	NA	NA	NA
styrene	3.6E+05	4.8E+09	1.0E+00	NA	NA	NA	NA
tetrachloroethene	2.3E+05	4.8E+09	1.0E+00	NA	NA	NA	NA
toluene	1.0E+05	4.8E+09	1.0E+00	NA	NA	NA	NA
toxaphene	6.2E+06	4.8E+09	1.0E+00	NA	NA	NA	NA
trans-1,2-dichloroethene	5.9E+04	4.8E+09	1.0E+00	NA	NA	NA	NA
trichloroethene	6.9E+04	4.8E+09	1.0E+00	NA	NA	NA	NA
trichlorofluoromethane	3.3E+04	4.8E+09	1.0E+00	NA	NA	NA	NA
vanadium	NA	4.8E+09	1.0E+00	NA	NA	NA	NA
vinyl acetate	1.4E+05	4.8E+09	1.0E+00	NA	NA	NA	NA
vinyl chloride	1.5E+03	4.8E+09	1.0E+00	NA	NA	NA	NA
xylenes	2.5E+05	4.8E+09	1.0E+00				

**Table C (cont.)**  
**Summary of Unit Risk Characterization**  
**Construction Worker**  
**Via Inhalation of Particulates and Volatiles**

**Table D**  
**Summary of Unit Risk Calculations**  
**Construction Worker**

## Chemicals of Concern

#### **Unit Hazard Quotient**

### Unit Incremental Lifetime Cancer Risk

**Table E**  
**Summary of Health-Based Soil Concentrations**  
**Via Construction Worker Scenario**

### Chemicals of Concern

pentachlorophenol  
phenol  
pyrene  
selenium  
silver  
styrene  
tetrachloroethene  
toluene  
toxaphene  
trans-1,2-dichloroethene  
trichloroethene  
trichlorofluoromethane  
vanadium  
vinyl acetate  
vinyl chloride  
xylenes  
zinc

## Hazard Quotient

## Incremental Lifetime Cancer Risk

Application for  
Facility Permit / Waste Discharge  
**Supplemental Documentation**  
Boeing Realty Corporation  
C-6 Facility

**Attachment 2**

**Waste Profile Sheets**

**Analytical Data Summary**  
**Remedial Excavation OA1-RE-1 Stockpile A**

Analyte	EPA Method	Sample Number and Collection Date	
		OA1-RE1-SP1	
		7/15/97	
TRPH (mg/kg)	418.1	2,100	
<b>Title 22 Metals (mg/kg)</b>			<b>Regulatory Levels</b>
Antimony	6010	<5.0	TTLC (mg/kg)      STLC (mg/L)
Arsenic	6010	<1.0	500      15
Barium	6010	100	500      5
Beryllium	6010	<0.1	10,000      100
Cadmium	6010	<0.1	75      0.75
Chromium (VI)	7196	<0.5	100      1
Chromium (total)	6010	80 (2)(3)	500      5
Cobalt	6010	7.4	2,500      5
Copper	6010	12	8,000      80
Lead (total)	6010	190 (4)(5)	2,500      25
Mercury	7471	<0.01	1,000      5
Molybdenum	6010	<0.5	3,500      0.2
Nickel	6010	11	2,000      350
Selenium	6010	<1.0	700      20
Silver	6010	<0.1	500      5
Thallium	6010	<5.0	2,400      7
Vanadium	6010	33	5,000      24
Zinc	6010	44	
<b>VOCs (1) (mg/kg)</b>			
1,3,5-Trimethylbenzene	8260	0.130	
1,2,4-Trimethylbenzene	8260	0.160	
n-Butylbenzene	8260	0.031	
Naphthalene	8260	0.100	
<b>SVOCs (1) (mg/kg)</b>			
Acenaphthene	8270	2.900	
Anthracene	8270	1.700	
Benzo (a) Anthracene	8270	72.000	
Benzo (b) Fluoranthene	8270	76.000	
Benzo (k) Fluoranthene	8270	33.000	
Benzo (a) Pyrene	8270	40.000	
Benzo (g,h,i) Perylene	8270	28.000	
Chrysene	8270	200.000	
Dibenz (a,h) Anthracene	8270	9.700	
Fluoranthene	8270	180.000	
Fluorene	8270	11.000	
Indeno (1,2,3-cd)Pyrene	8270	19.000	
2-Methylnaphthalene	8270	85.000	
Naphthalene	8270	18.000	
Phenanthrene	8270	95.000	
Pyrene	8270	220.000	
<b>Carbon Chain Range (mg/kg)</b>	8015m	--	
<b>PCBs (mg/kg)</b>	8080	--	

mg/kg = milligrams per kilogram

mg/L = milligrams per liter

-- = not analyzed

ND = not detected

VOCs = Volatile Organic Compounds

SVOCs = Semi-volatile Organic Compounds

TRPH = Total Recoverable Petroleum Hydrocarbons

PCBs = Polychlorinated biphenyls

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration

(1) VOCs and SVOCs not listed were not detected

(2) Waste Extraction Test performed on this sample. Result was 0.27 mg/L.

(3) TCLP analysis performed on this sample. Result was <0.1 mg/L.

(4) Waste Extraction Test performed on this sample. Result was <1.0 mg/L.

(5) TCLP analysis performed on this sample. Result was <1.0 mg/L.

**Analytical Data Summary**  
**Remedial Excavation OA1-RE1 Stockpile B**

Analyte	EPA Method	Sample Number and Collection Date	
		OA1-RE1-SP2	
		7/15/97	
TRPH (mg/kg)	418.1	1,000	
<b>Title 22 Metals (mg/kg)</b>			<b>Regulatory Levels</b>
Antimony	6010	<5.0	TTLC (mg/kg)      STLC (mg/L)
Arsenic	6010	<1.0	500      5
Barium	6010	110	10,000      100
Beryllium	6010	<0.1	75      0.75
Cadmium	6010	<0.1	100      1
Chromium (VI)	7196	<0.5	500      5
Chromium (total)	6010	87 (2)(3)	2,500      5
Cobalt	6010	7.3	8,000      80
Copper	6010	14	2,500      25
Lead (total)	6010	220 (4)(5)	1,000      5
Mercury	7471	<0.01	20      0.2
Molybdenum	6010	<0.5	3,500      350
Nickel	6010	12	2,000      20
Selenium	6010	<1.0	100      1
Silver	6010	<0.1	500      5
Thallium	6010	<5.0	700      7
Vanadium	6010	34	2,400      24
Zinc	6010	60	5,000      250
<b>VOCs (1) (mg/kg)</b>			
1,3,5-Trimethylbenzene	8260	0.044	
1,2,4-Trimethylbenzene	8260	0.110	
n-Butylbenzene	8260	0.040	
Naphthalene	8260	1.000	
<b>SVOCs (1) (mg/kg)</b>			
Acenaphthene	8270	0.620	
Anthracene	8270	1.800	
Benzo (a) Anthracene	8270	5.100	
Benzo (b) Fluoranthene	8270	6.200	
Benzo (k) Fluoranthene	8270	2.200	
Benzo (a) Pyrene	8270	3.700	
Benzo (g,h,i) Perylene	8270	3.000	
Chrysene	8270	9.900	
Dibenz (a,h) Anthracene	8270	1.000	
Fluoranthene	8270	9.900	
Fluorene	8270	1.700	
Indeno (1,2,3-cd)Pyrene	8270	1.900	
2-Methylnaphthalene	8270	8.600	
Naphthalene	8270	1.000	
Phenanthrene	8270	12.000	
Pyrene	8270	20.000	
<b>Carbon Chain Range (mg/kg)</b>	8015m	--	
<b>PCBs (mg/kg)</b>	8080	--	

mg/kg = milligrams per kilogram

mg/L = milligrams per liter

-- = not analyzed

ND = not detected

VOCs = Volatile Organic Compounds

SVOCs = Semi-volatile Organic Compounds

TRPH = Total Recoverable Petroleum Hydrocarbons

PCBs = Polychlorinated biphenyls

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration

(1) VOCs and SVOCs not listed were not detected

(2) Waste Extraction Test performed on this sample. Result was 1.8 mg/L.

(3) TCLP analysis performed on this sample. Result was 0.13 mg/L.

(4) Waste Extraction Test performed on this sample. Result was 4.5 mg/L.

(5) TCLP analysis performed on this sample. Result was <1.0 mg/L.

**Analytical Data Summary**  
**Remedial Excavation OA1-RE-1 Stockpile G**

Analyte	EPA Method	Sample Number and Collection Date	
		OA1-RE1-SP7 7/15/97	
TRPH (mg/kg)	418.1	3,100	
<b>Title 22 Metals (mg/kg)</b>			
Antimony	6010	<5.0	500 15
Arsenic	6010	<1.0	500 5
Barium	6010	110	10,000 100
Beryllium	6010	<0.1	75 0.75
Cadmium	6010	<0.1	100 1
Chromium (VI)	7196	<0.5	500 5
Chromium (total)	6010	110 (2)(3)	2,500 5
Cobalt	6010	7.0	8,000 80
Copper	6010	20	2,500 25
Lead (total)	6010	14	1,000 5
Mercury	7471	<0.01	20 0.2
Molybdenum	6010	<0.5	3,500 350
Nickel	6010	13	2,000 20
Selenium	6010	<1.0	100 1
Silver	6010	<0.1	500 5
Thallium	6010	<5.0	700 7
Vanadium	6010	36	2,400 24
Zinc	6010	65	5,000 250
<b>VOCs (1) (mg/kg)</b>			
Ethylbenzene	8260	1.700	
Total Xylenes	8260	13.000	
n-Propylbenzene	8260	0.920	
1,3,5-Trimethylbenzene	8260	9.600	
1,2,4-Trimethylbenzene	8260	23.000	
n-Butylbenzene	8260	1.100	
Naphthalene	8260	64.000	
<b>SVOCS (1) (mg/kg)</b>			
Acenaphthene	8270	3.500	
Anthracene	8270	7.500	
Benzo (a) Anthracene	8270	14.000	
Benzo (b) Fluoranthene	8270	12.000	
Benzo (g,h,i) Perylene	8270	10.000	
Chrysene	8270	31.000	
Fluoranthene	8270	18.000	
Fluorene	8270	10.000	
2-Methylnaphthalene	8270	160.000	
Naphthalene	8270	41.000	
Phenanthrene	8270	59.000	
Pyrene	8270	55.000	
<b>Carbon Chain Range (mg/kg)</b>	8015m	--	
<b>PCBs (mg/kg)</b>	8080	--	

mg/kg = milligrams per kilogram

(1) VOCs and SVOCs not listed were not detected

mg/L = milligrams per liter

(2) Waste Extraction Test performed on this sample. Result was 0.56 mg/L.

-- = not analyzed

(3) TCLP analysis performed on this sample. Result was <0.1 mg/L.

ND = not detected

VOCs = Volatile Organic Compounds

SVOCS = Semi-volatile Organic Compounds

TRPH = Total Recoverable Petroleum Hydrocarbons

PCBs = Polychlorinated biphenyls

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration

**Analytical Data Summary**  
**Remedial Excavation OA1-RE-1 Stockpile I**

Analyte	EPA Method	Sample Number and Collection Date	
		OA1-RE1-SP9	
		7/16/97	
TRPH (mg/kg)	418.1	700	
<b>Title 22 Metals (mg/kg)</b>			<b>Regulatory Levels</b>
Antimony	6010	<5.0	TTLC (mg/kg)      STLC (mg/L)
Arsenic	6010	<1.0	500      5
Barium	6010	110	10,000      100
Beryllium	6010	<0.1	75      0.75
Cadmium	6010	<0.1	100      1
Chromium (VI)	7196	<0.5	500      5
Chromium (total)	6010	31	2,500      5
Cobalt	6010	8.3	8,000      80
Copper	6010	12	2,500      25
Lead (total)	6010	<1.0	1,000      5
Mercury	7471	<0.01	20      0.2
Molybdenum	6010	<0.5	3,500      350
Nickel	6010	13	2,000      20
Selenium	6010	<1.0	100      1
Silver	6010	<0.1	500      5
Thallium	6010	<5.0	700      7
Vanadium	6010	36	2,400      24
Zinc	6010	45	5,000      250
<b>VOCs (1) (mg/kg)</b>			
n-Propylbenzene	8260	0.063	
1,2,4-Trimethylbenzene	8260	0.110	
n-Butylbenzene	8260	0.110	
Naphthalene	8260	4.300	
<b>SVOCs (1) (mg/kg)</b>			
Acenaphthene	8270	0.890	
Anthracene	8270	1.900	
Benzo (a) Anthracene	8270	2.800	
Benzo (b) Fluoranthene	8270	2.100	
Benzo (k) Fluoranthene	8270	0.790	
Benzo (a) Pyrene	8270	2.800	
Benzo (g,h,i) Perylene	8270	2.000	
Chrysene	8270	3.700	
Fluoranthene	8270	2.500	
Fluorene	8270	1.600	
Indeno (1,2,3-cd)Pyrene	8270	0.980	
2-Methylnaphthalene	8270	31.000	
Naphthalene	8270	6.800	
Phenanthrene	8270	14.000	
Pyrene	8270	13.000	
<b>Carbon Chain Range (mg/kg)</b>	8015m	--	
<b>PCBs (mg/kg)</b>	8080	--	

mg/kg = milligrams per kilogram

(1) VOCs and SVOCs not listed were not detected

mg/L = milligrams per liter

-- = not analyzed

ND = not detected

VOCs = Volatile Organic Compounds

SVOCs = Semi-volatile Organic Compounds

TRPH = Total Recoverable Petroleum Hydrocarbons

PCBs = Polychlorinated biphenyls

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration

**Analytical Data Summary**  
**Remedial Excavation OA1-RE-1 Stockpile J**

Analyte	EPA Method	Sample Number and Collection Date		Regulatory Levels
		OA1-RE1-SP10 7/16/97	PL-GS-1-2.5' 6/3/97	
TRPH (mg/kg)	418.1	13,000	16,000	
TPHd (mg/kg)	8015M	--	38,000	
TPHg (mg/kg)	8015M	--	100	
<b>Title 22 Metals (mg/kg)</b>				
Antimony	6010	<5.0	<5.0	500 15
Arsenic	6010	<1.0	<1.0	500 5
Barium	6010	95	96	10,000 100
Beryllium	6010	<0.1	<0.1	75 0.75
Cadmium	6010	<0.1	1.4	100 1
Chromium (VI)	7196	<0.5	<0.5	500 5
Chromium (total)	6010	38	250 (2)	2,500 5
Cobalt	6010	6.6	6.0	8,000 80
Copper	6010	11	28	2,500 25
Lead (total)	6010	21	290 (3)	1,000 5
Mercury	7471	<0.01	<0.01	20 0.2
Molybdenum	6010	<0.5	<0.5	3,500 350
Nickel	6010	11	15	2,000 20
Selenium	6010	<1.0	<1.0	100 1
Silver	6010	<0.1	<0.1	500 5
Thallium	6010	<5.0	<5.0	700 7
Vanadium	6010	28	28	2,400 24
Zinc	6010	41	94	5,000 250
<b>VOCs (1) (mg/kg)</b>				
Ethylbenzene	8260	<0.0025	0.270	
Total Xylenes	8260	<0.0025	0.140	
Isopropylbenzene	8260	<0.0025	0.100	
n-Propylbenzene	8260	<0.0025	0.190	
1,3,5-Trimethylbenzene	8260	0.110	0.210	
1,2,4-Trimethylbenzene	8260	<0.0025	0.350	
sec-Butylbenzene	8260	<0.0025	0.130	
Naphthalene	8260	0.860	1.300	
<b>SVOCs (1) (mg/kg)</b>				
Acenaphthene	8270	4.300	2.100	
Anthracene	8270	11.000	5.600	
Benzo (a) Anthracene	8270	26.000	15.000	
Benzo (b) Fluoranthene	8270	28.000	23.000	
Benzo (k) Fluoranthene	8270	12.000	7.200	
Benzo (a) Pyrene	8270	22.000	13.000	
Benzo (g,h,i) Perylene	8270	14.000	10.000	
Chrysene	8270	48.000	30.000	
Fluoranthene	8270	53.000	30.000	
Fluorene	8270	13.000	5.600	
Indeno (1,2,3-cd)Pyrene	8270	6.800	6.300	
2-Methylnaphthalene	8270	160.000	8.200	
Naphthalene	8270	41.000	1.400	
Phenanthrene	8270	80.000	36.000	
Pyrene	8270	120.000	72.000	
<b>Carbon Chain Range (mg/kg)</b>				
Up to and including C12	8015m	480	1,500	
C13-C22	8015m	7,600	31,000	
C23 and higher	8015m	2,100	7,900	
<b>PCBs (mg/kg)</b>	8080	ND	ND	

mg/kg = milligrams per kilogram

mg/L = milligrams per liter

-- = not analyzed

ND = not detected

VOCs = Volatile Organic Compounds

SVOCs = Semi-volatile Organic Compounds

TRPH = Total Recoverable Petroleum Hydrocarbons

PCBs = Polychlorinated biphenyls

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration

(1) VOCs and SVOCs not listed were not detected

(2) Waste Extraction Test performed on this sample. Result was 4.5 mg/L.

(3) Waste Extraction Test performed on this sample. Result was 1.8 mg/L.

TPHd = Total Petroleum Hydrocarbons as diesel

TPHg = Total Petroleum Hydrocarbons as gasoline

**Analytical Data Summary**  
**Remedial Excavation OA1-RE-2 Stockpile A1/A2**

Analyte	EPA Method	Sample Number and Collection Date		Regulatory Levels	
		OA1-RE2-SP1A 7/16/97	OA1-RE2-SP1B 7/16/97		
TRPH (mg/kg)	418.1	8,300	83	TTL	STLC
<b>Title 22 Metals (mg/kg)</b>					
Antimony	6010	<5.0	<5.0	500	15
Arsenic	6010	<1.0	<1.0	500	5
Barium	6010	81	110	10,000	100
Beryllium	6010	<0.1	<0.1	75	0.75
Cadmium	6010	<0.1	<0.1	100	1
Chromium (VI)	7196	<0.5	<0.5	500	5
Chromium (total)	6010	43	29	2,500	5
Cobalt	6010	5.9	8.1	8,000	80
Copper	6010	9.6	11	2,500	25
Lead (total)	6010	4.2	5.0	1,000	5
Mercury	7471	<0.01	<0.01	20	0.2
Molybdenum	6010	<0.5	<0.5	3,500	350
Nickel	6010	8.6	14	2,000	20
Selenium	6010	<1.0	<1.0	100	1
Silver	6010	<0.1	<0.1	500	5
Thallium	6010	<5.0	<5.0	700	7
Vanadium	6010	25	27	2,400	24
Zinc	6010	29	48	5,000	250
<b>VOCs (1) (mg/kg)</b>					
Ethylbenzene	8260	2.500	<0.0025		
Total Xylenes	8260	4.200	<0.0025		
n-Propylbenzene	8260	1.600	<0.0025		
1,3,5-Trimethylbenzene	8260	0.580	<0.0025		
1,2,4-Trimethylbenzene	8260	36.000	<0.0025		
n-Butylbenzene	8260	2.700	<0.0025		
Naphthalene	8260	110.000	0.017		
<b>SVOCs (1) (mg/kg)</b>					
Acenaphthene	8270	6.200	<0.100		
Anthracene	8270	16.000	0.160		
Benzo (a) Anthracene	8270	43.000	0.790		
Benzo (b) Fluoranthene	8270	55.000	1.200		
Benzo (k) Fluoranthene	8270	19.000	<0.250		
Benzo (a) Pyrene	8270	40.000	0.570		
Benzo (g,h,i) Perylene	8270	26.000	0.420		
Chrysene	8270	64.000	2.100		
Dibenz (a,h) Anthracene	8270	6.200	<0.100		
Fluoranthene	8270	95.000	1.700		
Fluorene	8270	19.000	<0.100		
Indeno (1,2,3-cd)Pyrene	8270	15.000	0.300		
2-Methylnaphthalene	8270	300.000	0.430		
Naphthalene	8270	87.000	<0.100		
Phenanthrene	8270	130.000	0.970		
Pyrene	8270	200.000	2.200		
Carbon Chain Range (mg/kg)	8015m	--	--		
PCBs (mg/kg)	8080	--	--		

mg/kg = milligrams per kilogram

(1) VOCs and SVOCs not listed were not detected

mg/L = milligrams per liter

-- = not analyzed

ND = not detected

VOCs = Volatile Organic Compounds

SVOCs = Semi-volatile Organic Compounds

TRPH = Total Recoverable Petroleum Hydrocarbons

PCBs = Polychlorinated biphenyls

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration

**Analytical Data Summary**  
**Remedial Excavation OA1-RE-9 Stockpile B**

Analyte	EPA Method	Sample Number and Collection Date			Regulatory Levels
		OA1-RE9-SP2 8/5/97	OA1-GS-6-3' 7/22/97	RR-GS-31-4' 6/4/97	
TRPH (mg/kg)	418.1	1,100	13	86	
<b>Title 22 Metals (mg/kg)</b>					
Antimony	6010	<5.0	<5.0	<5.0	500 15
Arsenic	6010	<1.0	<1.0	<1.0	500 5
Barium	6010	110	86	140	10,000 100
Beryllium	6010	<0.1	<0.1	<0.1	75 0.75
Cadmium	6010	<0.1	<0.1	<0.1	100 1
Chromium (VI)	7196	<0.5	<0.5	<0.5	500 5
Chromium (total)	6010	22	22	36	2,500 5
Cobalt	6010	9.0	6.4	8.4	8,000 80
Copper	6010	12	9.3	12	2,500 25
Lead (total)	6010	<1.0	<1.0	<1.0	1,000 5
Mercury	7471	<0.01	<0.01	<0.01	20 0.2
Molybdenum	6010	<0.5	<0.5	<0.5	3,500 350
Nickel	6010	12	8.3	13	2,000 20
Selenium	6010	<1.0	<1.0	<1.0	100 1
Silver	6010	<0.1	<0.1	<0.1	500 5
Thallium	6010	<5.0	<5.0	<5.0	700 7
Vanadium	6010	27	28	41	2,400 24
Zinc	6010	40	30	46	5,000 250
<b>VOCs (1) (mg/kg)</b>					
Ethylbenzene	8260	0.210	<0.0025	--	
Total Xylenes	8260	0.430	<0.0025	--	
n-Propylbenzene	8260	0.220	<0.0025	--	
1,3,5-Trimethylbenzene	8260	1.300	<0.0025	--	
1,2,4-Trimethylbenzene	8260	4.200	<0.0025	--	
n-Butylbenzene	8260	0.390	<0.0025	--	
Naphthalene	8260	16.000	<0.0025	--	
<b>SVOCs (1) (mg/kg)</b>					
Acenaphthene	8270	0.940	<0.800	--	
Anthracene	8270	1.200	<0.800	--	
Benzo (a) Anthracene	8270	1.900	27.000	--	
Benzo (b) Fluoranthene	8270	<1.000	46.000	--	
Benzo (k) Fluoranthene	8270	<1.000	9.400	--	
Benzo (g,h,i) Perylene	8270	<1.000	11.000	--	
Benzo (a) Pyrene	8270	2.200	16.000	--	
Chrysene	8270	3.600	29.000	--	
Dibenz (a,h) Anthracene	8270	<0.400	3.400	--	
Fluoranthene	8270	0.890	41.000	--	
Fluorene	8270	2.700	<0.800	--	
Indeno (1,2,3-cd)Pyrene	8270	<1.000	11.000	--	
2-Methylnaphthalene	8270	38.000	<0.800	--	
Naphthalene	8270	10.000	<0.800	--	
Phenanthrene	8270	12.000	<0.800	--	
Pyrene	8270	8.200	48.000	--	
<b>Carbon Chain Range (mg/kg)</b>					
8015m	--	--	--	--	
PCBs (mg/kg)	8080	--	--	--	ND

mg/kg = milligrams per kilogram

(1) VOCs and SVOCs not listed were not detected

mg/L = milligrams per liter

-- = not analyzed

ND = not detected

VOCs = Volatile Organic Compounds

SVOCs = Semi-volatile Organic Compounds

TRPH = Total Recoverable Petroleum Hydrocarbons

PCBs = Polychlorinated biphenyls

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration

**Analytical Data Summary**  
**Remedial Excavation OA1-RE-2 Stockpile C**

Analyte	EPA Method	Sample Number and Collection Date	
		OA1-RE2-SP3	7/16/97
TRPH (mg/kg)	418.1	240	
<b>Title 22 Metals (mg/kg)</b>			
Antimony	6010	<5.0	500 15
Arsenic	6010	<1.0	500 5
Barium	6010	77	10,000 100
Beryllium	6010	<0.1	75 0.75
Cadmium	6010	<0.1	100 1
Chromium (VI)	7196	<0.5	500 5
Chromium (total)	6010	21	2,500 5
Cobalt	6010	6.1	8,000 80
Copper	6010	9.5	2,500 25
Lead (total)	6010	<1.0	1,000 5
Mercury	7471	<0.01	20 0.2
Molybdenum	6010	<0.5	3,500 350
Nickel	6010	7.5	2,000 20
Selenium	6010	<1.0	100 1
Silver	6010	<0.1	500 5
Thallium	6010	<5.0	700 7
Vanadium	6010	25	2,400 24
Zinc	6010	28	5,000 250
<b>VOCs (1) (mg/kg)</b>			
1,3,5-Trimethylbenzene	8260	0.026	
1,2,4-Trimethylbenzene	8260	0.054	
n-Butylbenzene	8260	0.0083	
Naphthalene	8260	0.260	
<b>SVOCs (1) (mg/kg)</b>			
Anthracene	8270	16.000	
Benzo (a) Anthracene	8270	62.000	
Benzo (b) Fluoranthene	8270	64.000	
Benzo (k) Fluoranthene	8270	25.000	
Benzo (a) Pyrene	8270	32.000	
Benzo (g,h,i) Perylene	8270	18.000	
Chrysene	8270	63.000	
Dibenz (a,h) Anthracene	8270	5.800	
Dibenzofuran	8270	4.100	
Fluoranthene	8270	180.000	
Fluorene	8270	12.000	
Indeno (1,2,3-cd)Pyrene	8270	15.000	
2-Methylnaphthalene	8270	5.000	
Phenanthrene	8270	120.000	
Pyrene	8270	170.000	
Carbon Chain Range (mg/kg)	8015m	--	
PCBs (mg/kg)	8080	--	

mg/kg = milligrams per kilogram

(1) VOCs and SVOCs not listed were not detected

mg/L = milligrams per liter

-- = not analyzed

ND = not detected

VOCs = Volatile Organic Compounds

SVOCs = Semi-volatile Organic Compounds

TRPH = Total Recoverable Petroleum Hydrocarbons

PCBs = Polychlorinated biphenyls

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration

**Analytical Data Summary**  
**Remedial Excavation OA1-RE-2 Stockpile D**

Analyte	EPA Method	Sample Number and Collection Date	
		OA1-RE2-SP4	7/17/97
TRPH (mg/kg)	418.1	14,000	
<b>Title 22 Metals (mg/kg)</b>			
Antimony	6010	<5.0	500 15
Arsenic	6010	<1.0	500 5
Barium	6010	110	10,000 100
Beryllium	6010	<0.1	75 0.75
Cadmium	6010	1.8	100 1
Chromium (VI)	7196	<0.5	500 5
Chromium (total)	6010	27	2,500 5
Cobalt	6010	6.7	8,000 80
Copper	6010	17	2,500 25
Lead (total)	6010	30	1,000 5
Mercury	7471	<0.01	20 0.2
Molybdenum	6010	<0.5	3,500 350
Nickel	6010	22	2,000 20
Selenium	6010	<1.0	100 1
Silver	6010	<0.1	500 5
Thallium	6010	<5.0	700 7
Vanadium	6010	41	2,400 24
Zinc	6010	64	5,000 250
<b>VOCs (1) (mg/kg)</b>			
Total Xylenes	8260	0.170	
1,3,5-Trimethylbenzene	8260	0.210	
1,2,4-Trimethylbenzene	8260	0.490	
Naphthalene	8260	2.200	
<b>SVOCs (1) (mg/kg)</b>			
Acenaphthene	8270	6.200	
Anthracene	8270	17.000	
Benzo (a) Anthracene	8270	79.000	
Benzo (b) Fluoranthene	8270	110.000	
Benzo (k) Fluoranthene	8270	33.000	
Benzo (a) Pyrene	8270	57.000	
Benzo (g,h,i) Perylene	8270	44.000	
Chrysene	8270	190.000	
Dibenz (a,h) Anthracene	8270	12.000	
Fluoranthene	8270	140.000	
Fluorene	8270	17.000	
Indeno (1,2,3-cd)Pyrene	8270	30.000	
2-Methylnaphthalene	8270	180.000	
Naphthalene	8270	42.000	
Phenanthrene	8270	110.000	
Pyrene	8270	260.000	
<b>Carbon Chain Range (mg/kg)</b>			
Up to and including C12	8015m	870	
C13-C22	8015m	15,000	
C23 and higher	8015m	5,500	
PCBs (mg/kg)	8080	--	

mg/kg = milligrams per kilogram

(1) VOCs and SVOCs not listed were not detected

mg/L = milligrams per liter

-- = not analyzed

ND = not detected

VOCs = Volatile Organic Compounds

SVOCs = Semi-volatile Organic Compounds

TRPH = Total Recoverable Petroleum Hydrocarbons

PCBs = Polychlorinated biphenyls

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration

**Analytical Data Summary**  
**Remedial Excavation OA1-RE-2 Stockpile F**

Analyte	EPA Method	Sample Number and Collection Date	
		OA1-RE2-SP6	7/17/97
TRPH (mg/kg)	418.1	2,300	
<b>Title 22 Metals (mg/kg)</b>			
Antimony	6010	<5.0	500 15
Arsenic	6010	<1.0	500 5
Barium	6010	9.0	10,000 100
Beryllium	6010	<0.1	75 0.75
Cadmium	6010	1.3	100 1
Chromium (VI)	7196	<0.5	500 5
Chromium (total)	6010	2.9	2,500 5
Cobalt	6010	7.2	8,000 80
Copper	6010	13	2,500 25
Lead (total)	6010	9.7	1,000 5
Mercury	7471	<0.01	20 0.2
Molybdenum	6010	<0.5	3,500 350
Nickel	6010	16	2,000 20
Selenium	6010	<1.0	100 1
Silver	6010	<0.1	500 5
Thallium	6010	<5.0	700 7
Vanadium	6010	42	2,400 24
Zinc	6010	40	5,000 250
<b>VOCs (1) (mg/kg)</b>			
Ethylbenzene	8260	0.390	
Total Xylenes	8260	1.500	
n-Propylbenzene	8260	0.220	
1,3,5-Trimethylbenzene	8260	2.000	
1,2,4-Trimethylbenzene	8260	6.200	
n-Butylbenzene	8260	0.340	
Naphthalene	8260	17.000	
<b>SVOCs (1) (mg/kg)</b>			
Anthracene	8270	270.000	
Benzo (a) Anthracene	8270	1,300.000	
Benzo (b) Fluoranthene	8270	1,900.000	
Benzo (k) Fluoranthene	8270	430.000	
Benzo (a) Pyrene	8270	760.000	
Benzo (g,h,i) Perylene	8270	470.000	
Chrysene	8270	1,500.000	
Dibenz (a,h) Anthracene	8270	160.000	
Fluoranthene	8270	4,000.000	
Fluorene	8270	110.000	
Indeno (1,2,3-cd)Pyrene	8270	470.000	
Phenanthrene	8270	1,800.000	
Pyrene	8270	3,600.000	
<b>Carbon Chain Range (mg/kg)</b>	8015m	--	
<b>PCBs (mg/kg)</b>	8080	--	

mg/kg = milligrams per kilogram

(1) VOCs and SVOCs not listed were not detected

mg/L = milligrams per liter

-- = not analyzed

ND = not detected

VOCs = Volatile Organic Compounds

SVOCs = Semi-volatile Organic Compounds

TRPH = Total Recoverable Petroleum Hydrocarbons

PCBs = Polychlorinated biphenyls

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration

**Analytical Data Summary**  
**Remedial Excavation OA1-RE-2 Stockpile H**

Analyte	EPA Method	Sample Number and Collection Date		Regulatory Levels	
		OA1-RE2-SP8 7/17/97	RR-GS-37-4' 6/5/97		
TRPH (mg/kg)	418.1	4,600	<8.0		
TPHd (mg/kg)	8015M	--	<8.0		
TPHg (mg/kg)	8015M	--	<5.0		
<b>Title 22 Metals (mg/kg)</b>					
Antimony	6010	<5.0	<5.0	500	15
Arsenic	6010	<1.0	<1.0	500	5
Barium	6010	91	99	10,000	100
Beryllium	6010	<0.1	<0.1	75	0.75
Cadmium	6010	<0.1	<0.1	100	1
Chromium (VI)	7196	<0.5	<0.5	500	5
Chromium (total)	6010	49	25	2,500	5
Cobalt	6010	6.7	6.8	8,000	80
Copper	6010	12	9.5	2,500	25
Lead (total)	6010	27	<1.0	1,000	5
Mercury	7471	<0.01	<0.01	20	0.2
Molybdenum	6010	<0.5	<0.5	3,500	350
Nickel	6010	13	10	2,000	20
Selenium	6010	<1.0	<1.0	100	1
Silver	6010	<0.1	<0.1	500	5
Thallium	6010	<5.0	<5.0	700	7
Vanadium	6010	30	28	2,400	24
Zinc	6010	110	32	5,000	250
<b>VOCs (1) (mg/kg)</b>					
Total Xylenes	8260	0.150	<0.0025		
1,3,5-Trimethylbenzene	8260	0.330	<0.0025		
1,2,4-Trimethylbenzene	8260	0.970	<0.0025		
n-Butylbenzene	8260	0.120	<0.0025		
Naphthalene	8260	5.500	<0.0025		
<b>SVOCs (1) (mg/kg)</b>					
Acenaphthene	8270	1,100	<0.100		
Anthracene	8270	3,000	<0.100		
Benzo (a) Anthracene	8270	8,300	<0.100		
Benzo (b) Fluoranthene	8270	14,000	<0.250		
Benzo (k) Fluoranthene	8270	4,000	<0.250		
Benzo (a) Pyrene	8270	7,900	<0.250		
Benzo (g,h,i) Perylene	8270	6,000	<0.250		
Chrysene	8270	15,000	<0.100		
Dibenz (a,h) Anthracene	8270	1,300	<0.100		
Fluoranthene	8270	16,000	<0.100		
Fluorene	8270	3,400	<0.100		
Indeno (1,2,3-cd)Pyrene	8270	3,900	<0.250		
2-Methylnaphthalene	8270	40,000	<0.100		
Naphthalene	8270	9,800	<0.100		
Phenanthrene	8270	21,000	<0.100		
Pyrene	8270	34,000	<0.100		
<b>Carbon Chain Range (mg/kg)</b>	8015m	--	ND		
<b>PCBs (mg/kg)</b>	8080	--	ND		

mg/kg = milligrams per kilogram

mg/L = milligrams per liter

-- = not analyzed

ND = not detected

VOCs = Volatile Organic Compounds

SVOCs = Semi-volatile Organic Compounds

TRPH = Total Recoverable Petroleum Hydrocarbons

PCBs = Polychlorinated biphenyls

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration

(1) VOCs and SVOCs not listed were not detected

TPHd = Total Petroleum Hydrocarbons as diesel

TPHg = Total Petroleum Hydrocarbons as gasoline

**Analytical Data Summary**  
**Remedial Excavation OA1-RE-2 Stockpile I**

Analyte	EPA Method	Sample Number and Collection Date	
		OA1-RE2-SP9	7/18/97
TRPH (mg/kg)	418.1	1,300	
<b>Title 22 Metals (mg/kg)</b>			<b>Regulatory Levels</b>
Antimony	6010	<5.0	500 15
Arsenic	6010	<1.0	500 5
Barium	6010	100	10,000 100
Beryllium	6010	<0.1	75 0.75
Cadmium	6010	<0.1	100 1
Chromium (VI)	7196	<0.5	500 5
Chromium (total)	6010	37	2,500 5
Cobalt	6010	7.6	8,000 80
Copper	6010	16	2,500 25
Lead (total)	6010	34	1,000 5
Mercury	7471	<0.01	20 0.2
Molybdenum	6010	<0.5	3,500 350
Nickel	6010	14	2,000 20
Selenium	6010	<1.0	100 1
Silver	6010	<0.1	500 5
Thallium	6010	<5.0	700 7
Vanadium	6010	35	2,400 24
Zinc	6010	35	5,000 250
<b>VOCs (1) (mg/kg)</b>			
1,2,4-Trimethylbenzene	8260	0.0039	
Naphthalene	8260	0.023	
<b>SVOCs (1) (mg/kg)</b>			
Anthracene	8270	3.000	
Benzo (a) Anthracene	8270	20.000	
Benzo (b) Fluoranthene	8270	39.000	
Benzo (k) Fluoranthene	8270	11.000	
Benzo (a) Pyrene	8270	17.000	
Benzo (g,h,i) Perylene	8270	18.000	
Chrysene	8270	46.000	
Dibenz (a,h) Anthracene	8270	4.700	
Fluoranthene	8270	46.000	
Indeno (1,2,3-cd)Pyrene	8270	15.000	
Phenanthrene	8270	12.000	
Pyrene	8270	57.000	
<b>Carbon Chain Range (mg/kg)</b>	8015m	--	
<b>PCBs (mg/kg)</b>	8080	--	

mg/kg = milligrams per kilogram

(1) VOCs and SVOCs not listed were not detected

mg/L = milligrams per liter

-- = not analyzed

ND = not detected

VOCs = Volatile Organic Compounds

SVOCs = Semi-volatile Organic Compounds

TRPH = Total Recoverable Petroleum Hydrocarbons

PCBs = Polychlorinated biphenyls

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration

**Analytical Data Summary**  
**Remedial Excavation OA1-RE-2 Stockpile J**

Analyte	EPA Method	Sample Number and Collection Date		Regulatory Levels	
		OA1-RE2-SP10	7/18/97		
TRPH (mg/kg)	418.1	420			
<b>Title 22 Metals (mg/kg)</b>					
Antimony	6010	<5.0		500	15
Arsenic	6010	<1.0		500	5
Barium	6010	100		10,000	100
Beryllium	6010	<0.1		75	0.75
Cadmium	6010	<0.1		100	1
Chromium (VI)	7196	<0.5		500	5
Chromium (total)	6010	25		2,500	5
Cobalt	6010	7.1		8,000	80
Copper	6010	11		2,500	25
Lead (total)	6010	<1.0		1,000	5
Mercury	7471	<0.01		20	0.2
Molybdenum	6010	<0.5		3,500	350
Nickel	6010	11		2,000	20
Selenium	6010	<1.0		100	1
Silver	6010	<0.1		500	5
Thallium	6010	<5.0		700	7
Vanadium	6010	32		2,400	24
Zinc	6010	40		5,000	250
<b>VOCs (1) (mg/kg)</b>					
Total Xylenes	8260	0.0052			
1,3,5-Trimethylbenzene	8260	0.0085			
1,2,4-Trimethylbenzene	8260	0.029			
Naphthalene	8260	0.110			
<b>SVOCs (1) (mg/kg)</b>					
Anthracene	8270	0.940			
Benzo (a) Anthracene	8270	5.500			
Benzo (b) Fluoranthene	8270	8.800			
Benzo (k) Fluoranthene	8270	2.000			
Benzo (a) Pyrene	8270	3.600			
Benzo (g,h,i) Perylene	8270	4.000			
Chrysene	8270	13.000			
Dibenz (a,h) Anthracene	8270	1.100			
Fluoranthene	8270	13.000			
Fluorene	8270	0.230			
Indeno (1,2,3-cd)Pyrene	8270	3.400			
2-Methylnaphthalene	8270	3.000			
Naphthalene	8270	0.770			
Phenanthrene	8270	3.900			
Pyrene	8270	12.000			
<b>Carbon Chain Range (mg/kg)</b>					
8015m		--			
PCBs (mg/kg)	8080	--			

mg/kg = milligrams per kilogram

(1) VOCs and SVOCs not listed were not detected

mg/L = milligrams per liter

-- = not analyzed

ND = not detected

VOCs = Volatile Organic Compounds

SVOCs = Semi-volatile Organic Compounds

TRPH = Total Recoverable Petroleum Hydrocarbons

PCBs = Polychlorinated biphenyls

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration

**Analytical Data Summary**  
**Remedial Excavation OA1-RE-3 Stockpile B**

Analyte	EPA Method	Sample Number and Collection Date	
		OA1-RE3-SP2	7/18/97
TRPH (mg/kg)	418.1	1,500	
<b>Title 22 Metals (mg/kg)</b>			<b>Regulatory Levels</b>
Antimony	6010	<5.0	TTLC (mg/kg)      STLC (mg/L)
Arsenic	6010	<1.0	500      5
Barium	6010	120	10,000      100
Beryllium	6010	<0.1	75      0.75
Cadmium	6010	<0.1	100      1
Chromium (VI)	7196	<0.5	500      5
Chromium (total)	6010	28	2,500      5
Cobalt	6010	7.8	8,000      80
Copper	6010	12	2,500      25
Lead (total)	6010	<1.0	1,000      5
Mercury	7471	<0.01	20      0.2
Molybdenum	6010	<0.5	3,500      350
Nickel	6010	12	2,000      20
Selenium	6010	<1.0	100      1
Silver	6010	<0.1	500      5
Thallium	6010	<5.0	700      7
Vanadium	6010	34	2,400      24
Zinc	6010	40	5,000      250
<b>VOCs (1) (mg/kg)</b>			
Ethylbenzene	8260	0.300	
n-Propylbenzene	8260	0.310	
1,3,5-Trimethylbenzene	8260	1.500	
1,2,4-Trimethylbenzene	8260	2.500	
n-Butylbenzene	8260	0.420	
Naphthalene	8260	20.000	
<b>SVOCs (1) (mg/kg)</b>			
Acenaphthene	8270	1.400	
Anthracene	8270	3.200	
Benzo (a) Anthracene	8270	6.300	
Benzo (b) Fluoranthene	8270	7.600	
Benzo (k) Fluoranthene	8270	1.700	
Benzo (a) Pyrene	8270	5.100	
Benzo (g,h,i) Perylene	8270	3.700	
Chrysene	8270	9.500	
Fluoranthene	8270	11.000	
Fluorene	8270	3.400	
Indeno (1,2,3-cd)Pyrene	8270	2.300	
2-Methylnaphthalene	8270	45.000	
Naphthalene	8270	14.000	
Phenanthrene	8270	20.000	
Pyrene	8270	18.000	
<b>Carbon Chain Range (mg/kg)</b>	8015m	--	
<b>PCBs (mg/kg)</b>	8080	--	

mg/kg = milligrams per kilogram

(1) VOCs and SVOCs not listed were not detected

mg/L = milligrams per liter

-- = not analyzed

ND = not detected

VOCs = Volatile Organic Compounds

SVOCs = Semi-volatile Organic Compounds

TRPH = Total Recoverable Petroleum Hydrocarbons

PCBs = Polychlorinated biphenyls

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration

**Analytical Data Summary**  
**Remedial Excavation OA1-RE3 Stockpile C**

Analyte	EPA Method	Sample Number and Collection Date	
		OA1-RE3-SP3	7/18/97
TRPH (mg/kg)	418.1	1,700	
<b>Title 22 Metals (mg/kg)</b>			
Antimony	6010	<5.0	500 15
Arsenic	6010	<1.0	500 5
Barium	6010	110	10,000 100
Beryllium	6010	<0.1	75 0.75
Cadmium	6010	<0.1	100 1
Chromium (VI)	7196	<0.5	500 5
Chromium (total)	6010	25	2,500 5
Cobalt	6010	7.3	8,000 80
Copper	6010	12	2,500 25
Lead (total)	6010	<1.0	1,000 5
Mercury	7471	<0.01	20 0.2
Molybdenum	6010	<0.5	3,500 350
Nickel	6010	11	2,000 20
Selenium	6010	<1.0	100 1
Silver	6010	<0.1	500 5
Thallium	6010	<5.0	700 7
Vanadium	6010	34	2,400 24
Zinc	6010	40	5,000 250
<b>VOCs (1) (mg/kg)</b>			
Ethylbenzene	8260	0.130	
1,3,5-Trimethylbenzene	8260	0.590	
1,2,4-Trimethylbenzene	8260	1.000	
n-Butylbenzene	8260	0.260	
Naphthalene	8260	14.000	
<b>SVOCs (1) (mg/kg)</b>			
Acenaphthene	8270	1.200	
Anthracene	8270	2.600	
Benzo (a) Anthracene	8270	4.000	
Benzo (b) Fluoranthene	8270	4.000	
Benzo (k) Fluoranthene	8270	1.400	
Benzo (a) Pyrene	8270	3.900	
Benzo (g,h,i) Perylene	8270	3.000	
Chrysene	8270	6.800	
Fluoranthene	8270	5.100	
Fluorene	8270	2.800	
Indeno (1,2,3-cd)Pyrene	8270	1.300	
2-Methylnaphthalene	8270	52.000	
Naphthalene	8270	14.000	
Phenanthrene	8270	16.000	
Pyrene	8270	20.000	
Carbon Chain Range (mg/kg)	8015m	--	
PCBs (mg/kg)	8080	ND	

mg/kg = milligrams per kilogram

(1) VOCs and SVOCs not listed were not detected

mg/L = milligrams per liter

-- = not analyzed

ND = not detected

VOCs = Volatile Organic Compounds

SVOCs = Semi-volatile Organic Compounds

TRPH = Total Recoverable Petroleum Hydrocarbons

PCBs = Polychlorinated biphenyls

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration

**Analytical Data Summary**  
**Remedial Excavation OA1-RE-3 Stockpile E**

Analyte	EPA Method	Sample Number and Collection Date	
		OA1-RE3-SP5	7/21/97
TRPH (mg/kg)	418.1	47	
<b>Title 22 Metals (mg/kg)</b>			<b>Regulatory Levels</b>
Antimony	6010	<5.0	500 15
Arsenic	6010	<1.0	500 5
Banum	6010	110	10,000 100
Beryllium	6010	<0.1	75 0.75
Cadmium	6010	<0.1	100 1
Chromium (VI)	7196	<0.5	500 5
Chromium (total)	6010	43	2,500 5
Cobalt	6010	7.7	8,000 80
Copper	6010	14	2,500 25
Lead (total)	6010	5.0	1,000 5
Mercury	7471	<0.01	20 0.2
Molybdenum	6010	<0.5	3,500 350
Nickel	6010	11	2,000 20
Selenium	6010	<1.0	100 1
Silver	6010	<0.1	500 5
Thallium	6010	<5.0	700 7
Vanadium	6010	28	2,400 24
Zinc	6010	79	5,000 250
<b>VOCs (mg/kg)</b>	8260	ND	
<b>SVOCs (1) (mg/kg)</b>			
Anthracene	8270	0.660	
Benzo (a) Anthracene	8270	2.200	
Benzo (b) Fluoranthene	8270	2.700	
Benzo (k) Fluoranthene	8270	0.830	
Benzo (a) Pyrene	8270	1.300	
Benzo (g,h,i) Perylene	8270	0.780	
Chrysene	8270	3.200	
Dibenz (a,h) Anthracene	8270	0.220	
bis (2-Ethylhexyl)Phthalate	8270	0.110	
Fluoranthene	8270	8.400	
Fluorene	8270	0.330	
Indeno (1,2,3-cd)Pyrene	8270	0.630	
Phenanthrene	8270	4.300	
Pyrene	8270	7.500	
<b>Carbon Chain Range (mg/kg)</b>	8015m	--	
<b>PCBs (mg/kg)</b>	8080	--	

mg/kg = milligrams per kilogram

(1) SVOCs not listed were not detected

mg/L = milligrams per liter

-- = not analyzed

ND = not detected

VOCs = Volatile Organic Compounds

SVOCs = Semi-volatile Organic Compounds

TRPH = Total Recoverable Petroleum Hydrocarbons

PCBs = Polychlorinated biphenyls

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration

**Analytical Data Summary**  
**Remedial Excavation OA1-RE-4 Stockpile A**

Analyte	EPA Method	Sample Number and Collection Date		Regulatory Levels
		OA1-RE4-SP1 7/22/97	PL-GS-3-3' 6/3/97	
TRPH (mg/kg)	418.1	1,300	18,000	
TPHd (mg/kg)	8015M	--	28,000	
TPHg (mg/kg)	8015M	--	47	
<b>Title 22 Metals (mg/kg)</b>				
Antimony	6010	<5.0	<5.0	500 15
Arsenic	6010	<1.0	<1.0	500 5
Barium	6010	110	100	10,000 100
Beryllium	6010	<0.1	<0.1	75 0.75
Cadmium	6010	<0.1	<0.1	100 1
Chromium (VI)	7196	<0.5	<0.5	500 5
Chromium (total)	6010	160 (2)(3)	120 (4)	2,500 5
Cobalt	6010	7.1	6.0	8,000 80
Copper	6010	36	28	2,500 25
Lead (total)	6010	41	<1.0	1,000 5
Mercury	7471	<0.01	<0.01	20 0.2
Molybdenum	6010	<0.5	<0.5	3,500 350
Nickel	6010	15	10	2,000 20
Selenium	6010	<1.0	<1.0	100 1
Silver	6010	<0.1	<0.1	500 5
Thallium	6010	<5.0	<5.0	700 7
Vanadium	6010	33	24	2,400 24
Zinc	6010	280	60	5,000 250
<b>VOCs (1) (mg/kg)</b>				
Total Xylenes	8260	0.054	<0.100	
1,3,5-Trimethylbenzene	8260	0.053	0.240	
1,2,4-Trimethylbenzene	8260	0.170	0.640	
sec-Butylbenzene	8260	0.028	0.200	
p-Isopropyltoluene	8260		0.190	
n-Butylbenzene	8260	0.039	<0.100	
Naphthalene	8260	0.430	3.800	
<b>SVOCs (1) (mg/kg)</b>				
Benzo (a) Anthracene	8270	0.130	1.600	
Chrysene	8270	0.200	2.600	
bis (2-Ethylhexyl)Phthalate	8270	1.400	<1.000	
Butylbenzylphthalate	8270	0.190	<1.000	
Fluoranthene	8270	0.190	<1.000	
Fluorene	8270	0.280	3.700	
2-Methylnaphthalene	8270	1.900	8.900	
Naphthalene	8270	0.390	1.000	
Phenanthrene	8270	0.990	11.000	
Pyrene	8270	0.400	5.600	
<b>Carbon Chain Range (mg/kg)</b>				
Up to and including C12	8015m	--	2,000	
C13-C22	8015m	--	23,000	
C23 and higher	8015m	--	3,100	
<b>PCBs (1) (mg/kg)</b>				
PCB-1260	8080	0.035	ND	

mg/kg = milligrams per kilogram

mg/L = milligrams per liter

-- = not analyzed

ND = not detected

VOCs = Volatile Organic Compounds

SVOCs = Semi-volatile Organic Compounds

TRPH = Total Recoverable Petroleum Hydrocarbons

PCBs = Polychlorinated biphenyls

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration

(1) VOCs, SVOCs, and PCBs not listed were not detected

(2) Waste Extraction Test performed on this sample. Result was 2.2 mg/L.

(3) TCLP analysis performed on this sample. Result was <0.1 mg/L.

(4) Waste Extraction Test performed on this sample. Result was 2.8 mg/L.

**Analytical Data Summary**  
**Remedial Excavation OA1-RE-6 Stockpile J**

Analyte	EPA Method	Sample Number and Collection Date		Regulatory Levels
		OA1-RE6-SP3 7/29/97	PL-GS-9-3.5' 7/2/97	
TRPH (mg/kg)	418.1	4,700	16,000	
TPHd (mg/kg)	8015M	--	15,000	
TPHg (mg/kg)	8015M	--	250	
<b>Title 22 Metals (mg/kg)</b>				
Antimony	6010	<5.0	<5.0	500 15
Arsenic	6010	<1.0	<1.0	500 5
Barium	6010	98	110	10,000 100
Beryllium	6010	<0.1	<0.1	75 0.75
Cadmium	6010	<0.1	<0.1	100 1
Chromium (VI)	7196	<0.5	<0.5	500 5
Chromium (total)	6010	38	32	2,500 5
Cobalt	6010	7.2	7.0	8,000 80
Copper	6010	24	20	2,500 25
Lead (total)	6010	<1.0	<1.0	1,000 5
Mercury	7471	<0.01	<0.01	20 0.2
Molybdenum	6010	<0.5	<0.5	3,500 350
Nickel	6010	12	14	2,000 20
Selenium	6010	<1.0	<1.0	100 1
Silver	6010	<0.1	<0.1	500 5
Thallium	6010	<5.0	<5.0	700 7
Vanadium	6010	31	37	2,400 24
Zinc	6010	110	81	5,000 250
<b>VOCs (1) (mg/kg)</b>				
Ethylbenzene	8260	0.180	<0.100	
Trichloroethene	8260	0.085	<0.100	
Total Xylenes	8260	0.420	<0.100	
Isopropylbenzene	8260	0.230	0.100	
n-Propylbenzene	8260	0.370	<0.100	
1,3,5-Trimethylbenzene	8260	0.470	0.370	
1,2,4-Trimethylbenzene	8260	2.500	0.210	
sec-Butylbenzene	8260	0.350	0.410	
p-Isopropyltoluene	8260	0.470	0.570	
n-Butylbenzene	8260	0.460	0.280	
Naphthalene	8260	2.600	1.100	
<b>SVOCs (1) (mg/kg)</b>				
Acenaphthene	8270	<0.400	1,000	
Anthracene	8270	0.800	<0.800	
Benzo (a) Anthracene	8270	<0.400	1,000	
Chrysene	8270	<0.400	1,600	
Fluoranthene	8270	0.570	1,300	
Fluorene	8270	2.100	1,300	
2-Methylnaphthalene	8270	10.000	7,200	
Naphthalene	8270	3.700	1,500	
Phenanthrene	8270	5.300	6,000	
Pyrene	8270	0.620	1,900	
<b>Carbon Chain Range (mg/kg)</b>				
Up to and including C12	8015m	--	1,200	
C13-C22	8015m	--	12,000	
C23 and higher	8015m	--	3,100	
<b>PCBs (mg/kg)</b>	8080	--	ND	

mg/kg = milligrams per kilogram

(1) VOCs and SVOCs not listed were not detected

mg/L = milligrams per liter

TPHd = Total Petroleum Hydrocarbons as diesel

-- = not analyzed

TPHg = Total Petroleum Hydrocarbons as gasoline

ND = not detected

VOCs = Volatile Organic Compounds

SVOCs = Semi-volatile Organic Compounds

TRPH = Total Recoverable Petroleum Hydrocarbons

PCBs = Polychlorinated biphenyls

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration

**Analytical Data Summary**  
**Remedial Excavation OA1-RE-8 Stockpile I**

Analyte	EPA Method	Sample Number and Collection Date			
		OA1-RE8-SP5 8/4/97	OA1-GS-12-5' 7/22/97		
TRPH (mg/kg)	418.1	400	9,800		
<b>Title 22 Metals (mg/kg)</b>					
Antimony	6010	<5.0	<5.0	500	15
Arsenic	6010	<1.0	<1.0	500	5
Barium	6010	100	120	10,000	100
Beryllium	6010	<0.1	<0.1	75	0.75
Cadmium	6010	<0.1	<0.1	100	1
Chromium (VI)	7196	<0.5	<0.5	500	5
Chromium (total)	6010	24	29	2,500	5
Cobalt	6010	7.2	9.0	8,000	80
Copper	6010	9.0	12	2,500	25
Lead (total)	6010	<1.0	<1.0	1,000	5
Mercury	7471	<0.01	<0.01	20	0.2
Molybdenum	6010	<0.5	<0.5	3,500	350
Nickel	6010	9.9	14	2,000	20
Selenium	6010	<1.0	<1.0	100	1
Silver	6010	<0.1	<0.1	500	5
Thallium	6010	<5.0	<5.0	700	7
Vanadium	6010	26	37	2,400	24
Zinc	6010	46	40	5,000	250
<b>VOCs (1) (mg/kg)</b>					
Ethylbenzene	8260	<0.050	2.500		
n-Propylbenzene	8260	<0.050	1.700		
1,3,5-Trimethylbenzene	8260	<0.050	11.000		
1,2,4-Trimethylbenzene	8260	<0.050	36.000		
p-Isopropyltoluene	8260	0.069	<1.000		
n-Butylbenzene	8260	<0.050	2.600		
Naphthalene	8260	0.500	120.000		
<b>SVOCs (1) (mg/kg)</b>					
Acenaphthene	8270	0.240	<1.000		
Anthracene	8270	0.270	4.900		
Benzo (a) Anthracene	8270	0.670	6.600		
Benzo (g,h,i) Perylene	8270	<0.500	3.900		
Benzo (a) Pyrene	8270	0.730	5.800		
Chrysene	8270	1.100	10.000		
Fluoranthene	8270	0.670	8.700		
Fluorene	8270	0.600	7.500		
2-Methylnaphthalene	8270	8.000	130.000		
Naphthalene	8270	1.900	37.000		
Phenanthrene	8270	2.700	40.000		
Pyrene	8270	2.200	28.000		
Carbon Chain Range (mg/kg)	8015m	--	--		
PCBs (mg/kg)	8080	--	--		

mg/kg = milligrams per kilogram

mg/L = milligrams per liter

-- = not analyzed

ND = not detected

VOCs = Volatile Organic Compounds

SVOCs = Semi-volatile Organic Compounds

TRPH = Total Recoverable Petroleum Hydrocarbons

PCBs = Polychlorinated biphenyls

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration

(1) VOCs and SVOCs not listed were not detected

**Analytical Data Summary**  
**Remedial Excavation OA1-RE-9 Stockpile A**

Analyte	EPA Method	Sample Number and Collection Date			
		OA1-RE9-SP1 8/5/97	OA1-GS-13-9' 7/22/97		
				Regulatory Levels	
TRPH (mg/kg)	418.1	290	5,400	TTLC (mg/kg)	STLC (mg/L)
<b>Title 22 Metals (mg/kg)</b>					
Antimony	6010	<5.0	<5.0	500	15
Arsenic	6010	<1.0	<1.0	500	5
Barium	6010	93	100	10,000	100
Beryllium	6010	<0.1	<0.1	75	0.75
Cadmium	6010	<0.1	<0.1	100	1
Chromium (VI)	7196	<0.5	<0.5	500	5
Chromium (total)	6010	23	28	2,500	5
Cobalt	6010	6.9	7.2	8,000	80
Copper	6010	8.5	9.9	2,500	25
Lead (total)	6010	<1.0	<1.0	1,000	5
Mercury	7471	<0.01	<0.01	20	0.2
Molybdenum	6010	<0.5	<0.5	3,500	350
Nickel	6010	9.8	13	2,000	20
Selenium	6010	<1.0	<1.0	100	1
Silver	6010	<0.1	<0.1	500	5
Thallium	6010	<5.0	<5.0	700	7
Vanadium	6010	2.4	36	2,400	24
Zinc	6010	42	44	5,000	250
<b>VOCs (1) (mg/kg)</b>					
Ethylbenzene	8260	<0.050	1.700		
Total Xylenes	8260	0.150	4.800		
n-Propylbenzene	8260	<0.050	1.500		
1,3,5-Trimethylbenzene	8260	0.330	5.900		
1,2,4-Trimethylbenzene	8260	0.970	22.000		
n-Butylbenzene	8260	0.064	2.600		
Naphthalene	8260	2.700	97.000		
<b>SVOCs (1) (mg/kg)</b>					
Acenaphthene	8270	0.600	<2.000		
Anthracene	8270	1.100	6.200		
Benzo (a) Anthracene	8270	4.500	9.200		
Benzo (b) Fluoranthene	8270	5.100	<5.000		
Benzo (k) Fluoranthene	8270	3.100	<5.000		
Benzo (g,h,i) Perylene	8270	3.800	<5.000		
Benzo (a) Pyrene	8270	6.000	7.800		
Chrysene	8270	5.800	14.000		
Fluoranthene	8270	6.600	11.000		
Fluorene	8270	1.800	8.400		
Indeno (1,2,3-cd)Pyrene	8270	3.200	<5.000		
2-Methylnaphthalene	8270	17.000	160.000		
Naphthalene	8270	3.900	46.000		
Phenanthrene	8270	8.900	50.000		
Pyrene	8270	10.000	44.000		
<b>Carbon Chain Range (mg/kg)</b>					
Carbon Chain Range (mg/kg)	8015m	--	--		
PCBs (mg/kg)	8080	--	--		

mg/kg = milligrams per kilogram

(1) VOCs and SVOCs not listed were not detected

mg/L = milligrams per liter

-- = not analyzed

ND = not detected

VOCs = Volatile Organic Compounds

SVOCs = Semi-volatile Organic Compounds

TRPH = Total Recoverable Petroleum Hydrocarbons

PCBs = Polychlorinated biphenyls

TTLC = Total Threshold Limit Concentration

STLC = Soluble Threshold Limit Concentration